



United States  
Department of  
Agriculture

Forest  
Service

National Forests in North Carolina  
Pisgah National Forest  
Appalachian Ranger District  
Hot Springs Station

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**File Code:** 1950-1

**Date:** September 30, 2002

Dear Interested Citizen::

Enclosed is a copy of the Draft Environmental Assessment (DEA) for a proposed timber sale and associated activities on the Appalachian Ranger District. The project area of approximately 9,421 acres is located in Compartments 452-458, 463, and 464 in the Hurricane Creek area of Haywood County. All areas proposed for treatment are located in Management Area 3B. Five alternatives were evaluated and analyzed in detail in the DEA and Alternative D has been identified as the preferred alternative.

Alternative D proposes the following treatments: Timber harvesting (149 acres), herbicide site preparation (149 acres), supplemental planting of northern red oak (124 acres), advanced oak treatment with herbicide (125 acres), manual timber stand improvement (110 acres), creation and maintenance of 15 acres of grass/forb habitat with thinning and prescribed burning, rehabilitation of three existing wildlife openings (12 acres), wildlife field maintenance with prescribed burning on 13 acres, construction of wildlife openings (3 acres), erosion control at dispersed camping sites along Cold Springs Road, control of non-native species on less than one acre with herbicides, habitat improvement of sensitive species *Silene ovata* with mid-story slash down near the population (< 1 acre), and placement of signs and barriers in wildlife fields to reduce user conflicts. No new road construction or reconstruction is proposed with this alternative. Approximately 350 feet of temporary road would be needed to access the units.

Copies of this document can be viewed at the National Forests in North Carolina website ([www.cs.unca.edu/nfsnc](http://www.cs.unca.edu/nfsnc)) or additional copies can be mailed upon request.

Although a preferred alternative has been identified, the final decision on which alternative to implement has not been made. You are invited to provide written comments on the EA to the following address: USDA Forest Service, P.O. Box 128, Burnsville, NC 28714. Comments must be post marked on or before October 30, 2002.

I appreciate your continued interest in the management of our National Forests. If you have any questions regarding this proposal, please contact Karen Compton at the office in Burnsville at (828) 682-6146 or David McFee at the office in Hot Springs at (828) 622-3202.

Sincerely,

/s/ David K. McFee (for)  
PAUL BRADLEY  
District Ranger, Appalachian Ranger District

Enclosure



**United States Department of Agriculture  
Forest Service  
Pisgah National Forest  
Appalachian Ranger District**

**Environmental Assessment**

**Hurricane Timber Sale  
and  
Associated Activities**

**Compartments 452-458, 463 and 464  
Haywood County, North Carolina**

**Responsible Official: Paul L. Bradley  
District Ranger  
Appalachian Ranger District  
P.O. Box 128  
Burnsville, NC 28714**

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# TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>1</b>
<b>1.0 PURPOSE AND NEED FOR ACTION.....</b>	<b>1</b>
<b>1.1 Proposed Action .....</b>	<b>1</b>
<b>1.2 Purpose and Need for Project.....</b>	<b>1</b>
<b>1.3 Project Objectives .....</b>	<b>3</b>
<b>1.4 Decision to be Made.....</b>	<b>4</b>
<b>1.5 Scoping.....</b>	<b>4</b>
<b>1.6 Key Issues Considered and Discussed Throughout this Analysis .....</b>	<b>5</b>
1.6.1 Issue 1: Effects on wildlife species utilizing early successional habitat.....	5
1.6.2 Issue 2: Effects on wildlife species utilizing grass/forb habitat.....	6
1.6.3 Issue 3: Effects on wildlife species utilizing late successional habitat.....	6
1.6.4 Issue 4: Road Management.....	6
1.6.5 Issue 5: Effects on long-term oak and hard mast production.....	6
1.6.6 Issue 6: Producing a sustainable supply of timber in timber management area .....	6
1.6.7 Issue 7: Producing a short-term supply of timber in timber management areas.....	7
<b>1.7 Other Issues Considered .....</b>	<b>7</b>
1.7.1 Soil and Water Resources (Issue A) .....	7
1.7.2 Visual Resources (Issue B) .....	10
1.7.3 Heritage Resources (Issue C).....	10
1.7.4 Air Resources (Issue D) .....	11
1.7.5 Aquatic Resources (Issue E) .....	11
1.7.6 Botanical Resources (Issue F).....	13
1.7.7 Wildlife Resources (Issue G) .....	18
1.7.8 Old Growth (Issue H).....	23
1.7.9 Economic Considerations (Issue I) .....	25
1.7.10 Recreation (Issue J).....	26
1.7.11 Health and Safety (Issue K) .....	26
<b>1.8 Issues Beyond the Scope of this Analysis .....</b>	<b>27</b>
1.8.1 Logging on National Forest System Lands.....	27
1.8.2 Timber Theft .....	27
1.8.3 Global Warming.....	27
<b>2.0 ALTERNATIVES .....</b>	<b>29</b>
<b>2.1 Introduction.....</b>	<b>29</b>
<b>2.2 Descriptions of Proposed Treatments .....</b>	<b>29</b>
<b>2.3 Alternatives Considered .....</b>	<b>31</b>
2.3.1 Alternative A: No Action.....	31
2.3.2 Alternative B: Meets Minimums Established by the Forest Plan .....	32
2.3.3 Alternative C: Early Successional Emphasis.....	38
2.3.4 Alternative D: Long-term Oak Reproduction Emphasis with No New Roads .....	44
2.3.5 Alternative E: Late Successional Species Emphasis .....	50
<b>2.4 Alternatives Considered But Not in Detail .....</b>	<b>50</b>
<b>2.5 Summary Comparison of Actions .....</b>	<b>51</b>
<b>2.6 Summary Comparison of Effects .....</b>	<b>52</b>



### **3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES .....55**

#### **INTRODUCTION..... 55**

#### **3.1 Wildlife.....55**

##### **3.1.1 Species Utilizing Early Successional Habitat (Issue 1) ..... 56**

##### **Species Utilizing Grass/Forb Habitat (Issue 2)..... 56**

##### **Existing Condition (Ruffed Grouse and Eastern Wild Turkey)..... 56**

##### **Direct and Indirect Effects to Ruffed Grouse and Eastern Wild Turkey ..... 57**

##### **Cumulative Effects to Ruffed Grouse and Eastern Wild Turkey ..... 58**

##### **3.1.2 Species Utilizing Late Successional Habitat (Issue 3)..... 58**

##### **Existing Condition (Black Bear)..... 59**

##### **Direct and Indirect Effects to Black Bear ..... 59**

##### **Cumulative Effects to Black Bear..... 60**

#### **3.2 Roads..... 61**

##### **3.2.1 Roads Management (Issue 4)..... 61**

##### **Existing Condition (Roads)..... 61**

##### **Direct and Indirect Effects on Roads ..... 62**

##### **Cumulative Effects on Roads..... 63**

#### **3.3 Vegetation ..... 63**

##### **3.3.1 Long-term Oak and Hard Mast Production (Issue 5)..... 63**

##### **Existing Condition (Oak Stand Component and Hard Mast Production)..... 63**

##### **Direct and Indirect Effects to Oak Stand Component and Hard Mast Prod. .... 64**

##### **Cumulative Effects to Oak Stand Component and Hard Mast Production..... 65**

##### **3.3.2 Sustainable Supply of Timber in Timber Management Areas (Issue 6)..... 65**

##### **Existing Condition (Sustainable Supply of Timber)..... 65**

##### **Direct and Indirect Effects to Sustainable Supply of Timber ..... 66**

##### **Cumulative Effects to Sustainable Supply of Timber..... 67**

##### **3.3.3 Short-Term Supply of Timber (Issue 7)..... 67**

##### **Existing Condition (Short-Term Supply of Timber) ..... 67**

##### **Direct and Indirect Effects to Short-Term Supply of Timber ..... 67**

##### **Cumulative Effects to Short-Term Supply of Timber ..... 68**

### **4.0 LIST OF PREPARERS ..... 69**

#### **APPENDICES**

##### **A. Map of Compartments**

##### **B. Map of Management Areas**

##### **C. Map of Age Class Distribution**

##### **D. Map of Existing and Proposed Old Growth**

##### **E. Biological Evaluation**

##### **F. Economic Assumptions and Financial Efficiency Analysis**

##### **Economic Assumptions.....F-1**

##### **Financial Analysis - Alternative B .....F-3**

##### **Financial Analysis – Alternative C.....F-5**

##### **Financial Analysis – Alternative D .....F-7**

##### **Financial Analysis – Alternative E.....F-9**

##### **G. Management Indicator Species Habitat Evaluation**

##### **H. Emergency Spill Plan**

##### **I. Roads Information**

## **INTRODUCTION**

This environmental assessment (EA) documents the results of site-specific analysis concerning the proposed activities in the Hurricane Analysis Area on the Appalachian Ranger District. The EA discusses why the project is needed, the issues of concern, the existing condition of the project area, alternative ways to implement the project so that various interests and concerns are considered, and the expected consequences of each alternative, including a "no action" alternative.

### **1.0 PURPOSE AND NEED FOR ACTION**

#### **1.1 Proposed Action**

Proposed actions within the Hurricane project area include timber harvesting, silvicultural treatments, soil and water improvement, old growth designation, and wildlife habitat improvement. The project area of approximately 9,421 acres is located in Compartments 452-458, 463 and 464 in the Hurricane area of Haywood County. A map showing the project area and compartments boundaries is located in Appendix A.

The project area is located approximately 17 miles southwest of Hot Springs, North Carolina. The proposed actions are within the Pigeon River drainage basin and in the Hurricane Creek and Cold Springs Creek sub-basins. The project area is bordered by Cold Springs Creek and Pisgah National Forest lands to the northwest, a mixture of national forest system lands and private lands to the north and northeast, Pisgah National Forest to the west and southwest, and private land to the south and east. The project area has about 9,421 acres including forested and non-forested lands.

#### **1.2 Purpose and Need for the Project**

All actions are being proposed to achieve the goals, objectives, and desired future conditions identified in the Land and Resource Management Plan (hereafter, the Forest Plan) for the Nantahala and Pisgah National Forests issued in April 1987 and as amended. This environmental assessment (EA) is tiered to the Forest Plan and its Final Environmental Impact Statement (FEIS) and the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989. The Forest Plan establishes general management direction for specific areas called "Management Areas". The project area is within Management Areas (MAs) 1B, 2A, 3B, 4A, and 4C. A map of the MAs is located in Appendix B. The management direction for the five MAs is as follows:

- ❖ Management Area 1B: emphasizes sustainable supply of timber and providing motorized access into the forest for traditional forest uses such as hunting and gathering, firewood cutting, fishing, and recreational activities including ORV use and camping. Wildlife compatible with or that benefit from these conditions, such as grouse, deer and songbirds are likely to be present.

- ❖ Management Area 2A: emphasizes visually pleasing scenery for forest visitors. Roads are generally open with the adjacent forest land managed to provide that pleasing visual experience. Timber production is permitted, but modified to meet visual quality objectives.
- ❖ Management Area 3B: emphasizes sustainable supply of timber, but with few open roads and limited disturbance associated with motorized vehicles. These areas provide for habitat needs of wildlife such as wild turkey, deer, a variety of small mammals, and other species that will benefit from a managed forest with limited motorized access. Recreationists use these areas for hiking, mountain biking, horseback riding, hunting, and other activities. These areas will be managed to soften visual impacts of management activities.
- ❖ Management Area 4A: emphasizes managing for quality scenery, providing for non-motorized recreational uses, and habitat for animals that prefer a predominance of older vegetation and limited disturbance. Timber production is permitted but must be modified to emphasize visual quality and wildlife habitat.
- ❖ Management Area 4C: emphasizes visually pleasing scenery and habitats for wildlife requiring older forests. This land is not suitable for timber production at this time in order to meet visual quality objectives, or the lands are not cost efficient for timber production.

The nine compartments within the project area contain a total of 9,421 acres, which are allocated into the five MAs as follows:

**Table 1:** Acres in the Project Area by Compartment and Management Area

**ACRES BY MANAGEMENT AREA**

<b>Compartment #</b>	<b>1B</b>	<b>2A</b>	<b>3B</b>	<b>4A</b>	<b>4C</b>	<b>Total</b>
452		419	865			<b>1,284</b>
453			27		1,083	<b>1,110</b>
454			58		784	<b>842</b>
455					816	<b>816</b>
456			355		553	<b>908</b>
457		82	622		112	<b>816</b>
458		219	742			<b>961</b>
463			393		926	<b>1,319</b>
464	426		417	522		<b>1,365</b>
<b>TOTAL</b>	<b>426</b>	<b>720</b>	<b>3,479</b>	<b>522</b>	<b>4,274</b>	<b>9,421</b>

The purpose of the proposed actions is to provide for a sustainable, healthy ecosystem; to meet forest plan direction and standards for vegetation and wildlife management; to provide for future old growth; and to achieve desired future species and age class composition.

### 1.3 Project Objectives

All of the proposed treatments are located within Management Area (MA) 3B which places an emphasis on a sustainable supply of timber. MA 3B also provides for the habitat needs of wildlife such as wild turkey, deer, a variety of small mammals, and other species that will benefit from a managed forest with limited motorized access. General direction for MA 3B is to provide conditions for the large group of game and non-game animals that benefit from young to middle-aged forests and cannot tolerate motorized vehicular disturbance.

Forest-wide direction in the Forest Plan is to disperse early successional habitat across the landscape according to the following desired conditions: In MA 3B provide at least 5% but not to exceed 15% early successional habitat per compartment, provide at least 0.5% of MAs 1-5 in grass/forb openings at any one time. Currently MA 3B and Compartments 457 and 458, which are predominately MA 3B, are below the 5% early successional habitat recommended in the Forest Plan. The desired density of grass/forb openings for MA 3B is 3%. The Forest Plan also directs that timber management practices be used as the primary tool to create desired wildlife habitat in MAs 1B, 2A, 3B, and 4A.

Forest-wide direction calls for a regular and sustained flow of habitats across the Forests through space and time for diversity and viability of plant and animal populations. Harvesting Units 452/13, 452/28, 457/7 20, 457/9 15, 457/17, 458/8, 458/11, 458/16, 458/18, and 458/15 would provide early successional habitat for the next 10 to 20 years where the residual stand maintains 30 sqft/acre of basal area or less. Thinning and prescribed burning treatments proposed in Units 457/17, 456/2 4 18, and 458/6 would create additional grass/forb habitat. Additional grass/forb habitat would be created by construction of wildlife openings in Units 457/7 20, 457/9 15, and 457/17.

Riparian areas in both the harvest units and the rest of the analysis area would provide mid to late successional habitat for woodpeckers, squirrels, raccoons, black bear and associated species for the next 10 to 15 years. The proposed actions would maintain and/or enhance habitat for Proposed, Endangered, Threatened, and Sensitive (PETS) species and neotropical migratory birds.

A desired future condition of timber emphasis areas such as Management Area 3B is one which provides a sustainable supply of timber by regulating the growth and removal of trees through time. Harvesting in Units 452/13, 452/28, 457/7 20, 457/9 15, 457/17, 458/8, 458/11, 458/16, 458/18, and 458/15 would provide wood products to the regional economy and make progress toward reaching a balanced age class distribution. See

Appendix C for a map showing the current distribution of age classes across the analysis area.

A desired future condition for Management Area 4C is to provide for visually pleasing scenery and habitats for wildlife requiring older forests. These lands are not suitable for timber production. Currently, 346 acres in the analysis area are designated as “small patch” old growth areas. An additional 386 acres are proposed for designation as future old growth. See Appendix D for a map showing the current and proposed future old growth areas within the analysis area.

The Forest plan directs that actions that could mitigate or provide beneficial effects to sensitive species be incorporated into alternatives of project specific actions. Treatment to improve the habitat for the sensitive plant species *Silene ovata* is proposed while measures to protect the existing population have been incorporated into the alternatives.

The Forest Plan says to allow primitive camping except in areas where such use is in conflict with other forest uses or creates resource damage. There are places along Cold Springs Creek that are being used as dispersed camping sites. Some of these areas are causing resource damage such as erosion and sedimentation, which is impacting water quality. This project includes a proposal to rehabilitate those damaged areas by correcting erosion and sedimentation problems at dispersed camping sites.

## **1.4 Decision to be Made**

The District Ranger will use the information in this analysis to decide whether or not the Forest Service will proceed with this project, and if so, how to proceed. Other government agencies, groups, individuals, and Forest Service personnel interested and concerned about the potential outcome of this project will also use this publication as a basis for critiquing the various courses of action. If an action alternative is chosen, Forest Service personnel will use this document to guide in implementation and monitoring.

## **1.5 Scoping**

A letter announcing that the Appalachian Ranger District was conducting an area analysis in the Hurricane area of Haywood County was mailed to 86 individuals, groups, and organizations on June 17, 1998. The letter sent by the District Ranger requested input on opportunities, issues, and concerns for the proposed project area. Comments were requested by July 10, 1998.

On October 19, 1998, a letter from the District Ranger describing site-specific proposed actions and requesting comments was mailed to 85 individuals, groups, and organizations. Comments were requested by November 17, 1998. Due to other priorities, work was stopped on this project in 1999.

Additional work in the Hurricane analysis area (AA) began in the year 2000 and the proposals were refined and additional scoping was conducted. The Appalachian Ranger District announced through letters that it would be hosting a series of meetings to assist the district in developing additional alternatives to the proposed action for the Hurricane AA. This letter was mailed to 15 individuals, groups, and organizations that had previously commented on or expressed interest in the project area. The first informational meeting was held at the Asheville-Buncombe Technical College campus in Marshall, North Carolina on October 13, 2000. The meeting was attended by representatives from the Forest Service and three local interest groups. Those attending the meeting agreed to hold a second meeting, which was scheduled for October 31, 2000. No one other than Forest Service employees attended the October 31 meeting.

On November 6, 2000, District Ranger Paul Bradley sent a letter to all parties invited to the series of meetings disclosing that due to lack of public participation the district was not planning on holding additional alternative development meetings at that time. He invited additional comment and public input and listed employee contacts for anyone with comments or questions on the project.

On November 27, 2000, a letter describing the refined proposal was mailed to 92 individuals, groups, and organizations including those who had previously commented or asked to be kept informed on the project. In addition, this project has appeared in the Schedule of Proposed Actions for the National Forests in North Carolina, which is published quarterly, since January of 1999.

## **1.6 Key Issues Considered and Discussed Throughout this Analysis**

The key issues associated with this proposed project were identified through a public participation process, which included input from Forest Service natural resource specialists, other government agencies, private groups and individuals. A Forest Service Interdisciplinary Team (IDT) determined that the following issues are relevant to the decisions to be made concerning the Hurricane AA. Issues 1-7 directly influenced the initiation, development, and technical design of the project.

### **1.6.1 Issue 1: Effects on wildlife species utilizing early successional habitat**

- The Hurricane Analysis Area is currently below the desired conditions for dispersed early successional habitat outlined in the Forest Plan for Management Area 3B and Compartments 457 and 458.
- Lack of additional early successional habitat in the timber suitable portions of the project area could result in negative impacts to wildlife species dependent on early successional habitat.

**Indicator:** 0-10 year old stands (acres and %)

### 1.6.2 Issue 2: Effects on wildlife species utilizing grass/forb habitat

- The Hurricane Analysis Area is currently below the desired condition of 3% grass/forb openings in Management Areas 3B, 4A, and 4C.
- Lack of additional grass/forb habitat in the project area could result in negative impacts to wildlife species dependent on grass/forb habitat.

**Indicator:** Grass/forb openings (acres and %)

### 1.6.3 Issue 3: Effects on wildlife species utilizing late successional habitat

- Portions of the Hurricane Analysis Area are located within the Harmon Den Bear Sanctuary.
- The proposed harvesting activities may affect habitat for black bear and other species that utilize late successional habitat.

**Indicator:** 80+ year old stands (acres and %) in the analysis area

**Indicator:** 80+ year old stands (acres and %) in the Harmon Den Bear Sanctuary

### 1.6.4 Issue 4: Road Management

- Adding additional miles to the existing road system will influence the ability of the Forest Service to maintain all of the miles of road on the system.

**Indicator:** Miles of road added to the existing road system

### 1.6.5 Issue 5: Effects on long-term oak and hard-mast production (40+ years)

- The proposed harvesting activities and advanced oak treatments could change the future species composition by changing the oak component of some of the stands.
- Wildlife species dependent on hard mast could be negatively affected in the long-term by this proposal if the future oak component is reduced.

**Indicator:** Oak seedlings planted to supplement the natural regeneration (acres)

**Indicator:** Advanced oak treatment (acres)

**Indicator:** Stands contributing (acres and %) to hard-mast production in the analysis area

**Indicator:** Stands contributing (acres and %) to hard-mast production in the Harmon Den Bear Sanctuary

### 1.6.6 Issue 6: Producing a sustainable supply of timber in timber management areas

- The Hurricane project area does not currently have a balanced age class distribution, which would provide a sustainable supply of timber.

**Indicator:** Age-class distribution for timber suitable areas (acres per 10 year age class)

### 1.6.7 Issue 7: Producing a short-term supply of timber in timber management areas

- Portions of the Hurricane Analysis Area are located in management areas with an emphasis on timber production. These areas are managed to produce timber over both the short- and long-term.

**Indicator:** Volume of timber produced (CCF)

## 1.7 Other Issues Considered

The Hurricane Interdisciplinary Team (IDT) eliminated the following issues (resources) from detailed discussion in this Environmental Assessment as directed by CEQ Regulation 1500.1(b), 1500.2(b) and other sections because the project would cause only inconsequential effects to these issues (resources). Many of these issues are discussed in additional detail in appendices to this document as referenced below.

These issues were raised either through the public participation process or within the Forest Service. The IDT determined that the following issues differed little between alternatives and/or were not selection factors in deciding between the alternatives. Therefore, they are discussed here instead of in the Environmental Consequences chapter of the EA.

### 1.7.1 Soil and Water Resources (Issue A)

A soils analysis was completed for the Hurricane Analysis area and is located in the project file. The six soil map units found in the areas proposed for timber harvest are Edneyville-Chestnut Complex, Tuckasegee-Cullasaja Complex, Saunook loam, Plott fine sandy loam, Evard-Cowee Complex, and Cullasaja very cobbly loam. These loamy soils are moderately deep to very deep and well drained with moderate to severe hazard of erosion and equipment limitation, depending on degree (percent) of slope. Standard wheeled and tracked equipment can be used on these soils; however, compaction can be reduced by using low pressure ground equipment, harvesting with seasonal constraints, and avoiding equipment entry in areas with slopes greater than 40%. Cable harvesting on slopes greater than 40% requires fewer roads and causes less damage to the soils.

**Issue A1:** Timber harvesting and recreational activities in the Hurricane Analysis Area may be causing sediment to enter area streams. Graveling horse trails may help reduce erosion from horse trails.

Sedimentation is currently entering Cold Springs Creek in the form of runoff from FS Road 148. There are dispersed campsites along FS 148 that are contributing sediment to the stream through soil disturbance and compaction. The Harmon Den Horse Campground is located in the analysis area. Some illegal horseback riding is occurring where riders are seeking quicker access to the trail system from the



campground. To address this problem, a connector trail is being constructed that will provide legal access from the campground to the designated trails.

The Hurricane Creek watershed has also experienced large amounts of sedimentation in past years. There are several tracts of private land in this watershed that are accessed through surrounding Forest Service land. The access is by Forest Service Road 233, which is an unimproved dirt road. Hurricane Creek runs along this road for most of its length. Sedimentation has been a major problem in this stream. The problem was bad enough to earn Hurricane Creek a place on the North Carolina Division of Water Quality's 303 (d) list of impaired streams. Sedimentation of this stream is a direct result of illegal ORV use. To try and reduce sediment entering the stream, a watershed project has been approved and is in the process of being implemented. This project will use sediment traps, water bars, and roadside berms to help control the erosion and sedimentation.

Gravelling horse trails is not a very economical or practical way to reduce erosion on horseback riding trails. If trails are designed and built to standard and maintained to standard, erosion will be minimized.

**Issue A2:** Timber harvesting and road building, especially on steep slopes, may result in soil compaction, erosion and/or sedimentation in the Hurricane Analysis Area.

With any land disturbance, such as timber harvesting, there would be temporary increases in soil loss and sediment yield in the project area. Timber harvesting would result in localized and temporary soil compaction on temporary roads and log decks. Cable logging is proposed on steep slopes to minimize soil compaction and erosion.

Under the alternatives that proposed timber harvest (Alternatives B, C, and D), timber harvesting would occur within approximately 133 acres (Alternative B), 224 acres (Alternative C), or 149 acres (Alternative D) of the project area. Alternatives B and C would have approximately 0.6 miles of new road construction and about 0.3 miles of road reconstruction. Temporary road construction would be less than 0.25 mile in Alternatives B and C and about 0.10 mile with Alternative D. Log landings and skid roads are located within the unit boundaries and soil disturbance created by them is accounted for within the unit acreage. The combination of log landings, road reconstruction and construction, skid roads, creation of wildlife openings and timber harvesting would occur within between 1.5% and 2.5% of the entire project area if an alternative with ground disturbing activities were chosen.

The main concern of the proposed action is on-site effects. Potential for off-site effects (sedimentation) are directly related to the nature and area of disturbance on site. With the application of Forest Plan standards and contract requirements, neither erosion nor compaction would result in long-term reductions in soil productivity. Also, nutrient loss or disruption of the nutrient cycle is not severe enough to result in a lowering of site productivity.

Roads, landings, and skid trails will be seeded for wildlife; therefore, soil erosion is not expected as a potential problem. Cumulatively, the project would not add noticeable amounts of sediment to current conditions or reduce soil productivity below current conditions.

**Issue A3:** The road along Hurricane Creek is currently experiencing erosion problems and sedimentation into Hurricane Creek.

The Forest Service made a separate decision in June of 2002 (Hurricane Creek Watershed Project) that addressed and will improve the erosion problems and reduce sedimentation into Hurricane Creek.

**Issue A4:** Heating of the soil caused by prescribed burning may kill soil biota, alter soil physics, consume organic matter, or release soil nutrients such as nitrogen or heavy metals.

Prescribed burning would be executed during the dormant season (approximately November 1 - April 15) and is planned for low to moderate intensity to prevent soil scald and minimize the possibility of soil erosion. Consumption of the leaf layer would reduce the amount of organic matter on the site and change the amount and mobility of nutrients in the organic materials. Some of the organic matter may be redistributed into the mineral soil following light to moderate burning because fire releases nutrients tied up in organic materials. These nutrients are available to be utilized by the new vegetation. Mineral elements not volatilized by burning would remain in the ash. If the ash were removed by precipitation or wind, these elements would be lost from the site; otherwise, they would remain on the site and be added to the soil.

The forest is not aware of any research supporting heavy metal contamination of soil when it is heated by prescribed fire. Since most metals are found in the lower soil layers, unaffected by temperatures generated by a prescribed fire activity, background levels of heavy metals in the soil system would not be appreciably affected.

**Issue A5:** Prescribed burning may cause soil erosion and increased sediment yields, which may decrease water quality and aquatic habitat.

Given the low to moderate intensity of this proposed burn, burning would leave intact the fine root mat that is instrumental in holding the soil in place. The root mat would provide a matrix of living and dead organic material that physically binds the mineral soil against the potential erosive action of precipitation and runoff from the forest floor. Existing roads would be used as fire lines except for about 100 feet of hand built fire line to protect a rare plant population; therefore, there would be only

minimal soil disturbance associated with the construction of fire lines. Only low intensity prescribed fire would be allowed in riparian areas to protect vegetation that serves as shade for the streams.

### 1.7.2 Visual Resources (Issue B)

A scenery analysis was completed for the Hurricane Analysis area and is located in the project file. Field surveys and computer simulations were used to identify viewpoints (VPs) and determine visibility of proposed management activities. All travel corridors and use areas in and around the project area were considered for potential viewpoints. A total of 21 viewpoints were analyzed for this project. All mitigation measures recommended in the scenery analysis were incorporated into the alternatives.

**Issue B:** The visual quality of the area along the Appalachian Trail (AT), along other roads and trails in the project area, and from the Great Smokey Mountain National Park, may be impacted by timber harvesting and associated road construction and skid trails.

Past timber harvest areas and existing roads are currently visible on National Forest Lands from most VPs analyzed. From the AT, many of the existing harvest areas would not be noticeable to the average viewer. Some of the visible treatment areas will blend in with the surrounding forest within the next five years. Existing roads and landings may remain visible for many years, but are primarily seen during leaf-off season.

With the specified mitigation, treatments proposed for some areas will create small openings, or the canopy may appear thinner as seen from the specified viewpoints. However, all assigned Visual Quality Objectives (VQOs) will be met even though these proposed treatments would be seen in conjunction with existing modifications. All proposed activities would meet or exceed their assigned VQOs, from all viewpoints analyzed, with implementation of the recommended mitigation measures and all standard mitigation specified in the Forest Plan.

### 1.7.3 Heritage Resources (Issue C)

Archeologists have conducted heritage resource surveys on all areas proposed for treatment in the Hurricane Analysis Area. A total of seventeen archeological sites were located: 16 prehistoric and 1 historic/prehistoric. Six sites are rated Class II and considered potentially eligible for inclusion in the National Register of Historic Places (NRHP). Eleven sites are rated Class III and are not considered eligible for the NRHP. Three previously recorded sites are located within the analysis area. One of these sites is rated Class I and has been painted for avoidance, the other two sites are rated Class III.

**Issue C:** Proposed activities may impact archeological resources.

The Class III sites would not be affected by the proposed activities. The previously recorded Class I site and the six Class II sites identified by the archeologists would be protected by excluding them from the treatment areas. If during the implementation of a ground disturbing activity, a previously unknown archeological or historic site is encountered the disturbance would stop immediately. The activity would not be permitted to continue until a forest archeologist surveys and evaluates the site and makes a recommendation to permanently stop, modify, or proceed with the activity using appropriate mitigation measures. There would be no cumulative effects on heritage resources since no significant sites would be impacted.

#### 1.7.4 Air Resources (Issue D)

The Hurricane project area is classified as a Class II air quality area. Class II areas are general air areas and Class I areas are specially protected areas under the Clean Air Act as amended in 1977. The closest Class I air quality area to the areas proposed for prescribed burning is the Great Smoky Mountains National Park which is located approximately 5 air miles west and southwest of the project area.

**Issue D:** Prescribed burning may decrease air quality in the project area.

Smoke would temporarily impair local visibility. The U.S. Forest Service and the North Carolina Forest Service developed smoke Management Guidelines in 1988 that will be followed when prescribed burning takes place. A burning plan including smoke management guidelines will be used to reduce smoke emissions and enhance smoke dispersal. These guidelines provide for the protection of human health and visibility on highways and roads as well as Class I air quality areas. Areas that need special emphasis for smoke dispersal such as roads, highways, and neighboring property owners will be identified prior to beginning the prescribed burn. By following the Smoke Management Guidelines, air quality would be affected only locally and temporarily by this proposed activity.

#### 1.7.5 Aquatic Resources (Issue E)

Kelly Howell, Forest Service Fisheries Biologist, conducted aquatic habitat surveys of the proposed aquatic project and analysis areas on January 19, 2001. A copy of this Aquatic Resources Analysis is in Appendix E of this document. The surveys consisted of examining streams within the aquatic project area, noting habitat quality, quantity, and suitability for rare aquatic and management indicator species, as well as existing impacts and their source.

**Issue E1:** The proposed activities may impact wetlands or wild and scenic rivers.

There are no wetlands or wild and scenic rivers located within the activity areas.

**Issue E2:** Timber harvesting may cause sediment, which may decrease water quality and aquatic habitat and adversely affect fisheries.

The possible temporary increases in turbidity and sedimentation are not expected to affect aquatic habitat quality or quantity and would not affect aquatic populations. Turbidity levels would return to normal once soil disturbance stops, and erosion control measures are established and functioning. Any small amount of sediment entering streams during soil disturbance would be flushed downstream where it would not be observable or measurable. The amount of sediment potentially entering streams within the aquatic analysis area is not expected to be enough to measurably contribute to the sedimentation of the Pigeon River, Cold Springs Creek, or Hurricane Creek due to flow volume and sediment transport rates.

**Issue E3:** Timber harvesting may cause sediment, which may adversely affect aquatic Federally Threatened or Endangered species, including the Appalachian elktoe; Regionally Sensitive species or species of Forest Concern.

The Appalachian elktoe (*Alamidonta raveneliana*) is the only Federally Threatened or Endangered aquatic species considered for this project. This species may occur in the section of the Pigeon River included in the aquatic analysis area. Sedimentation from the proposed project would not affect this mussel species. This is due to the distance from the project area and the fact that any sediment generated from the project would fall out of the water column long before it reaches the Pigeon River.

Implementation of any of the action alternatives proposed for the Hurricane Timber Sale project would not have any impact on aquatic Regional Forester's Sensitive species or Forest concern species. Habitat for these species, should they occur in the project area, would not be affected. There would be no temperature changes in the Pigeon River due to the proposed project. Sedimentation should fall out of the water column before it enters the Pigeon River, Hurricane Creek, and Cold Springs Creek thus having no impact on the water quality.

**Issue E4:** Local streams and creeks may be negatively affected by the use of herbicide in the project area.

No herbicide will be applied within 30 horizontal feet of lakes, wetlands, or perennial or intermittent streams. No herbicide will be applied within 100 horizontal feet of any public or domestic water source. Exclusion zones will be clearly marked before herbicide application so applicators can easily see and

avoid them. The risk of glyphosate, the active ingredient in Accord, leaving the site is negligible because glyphosate binds tightly to the soil and has practically no leaching ability.

#### 1.7.6 Botanical Resources (Issue F)

David Danley, Forest Service Botanist, conducted surveys of the proposed units on April 21, 27, 28; May 4, 5, 11, 12; Sept. 11; and Oct. 13, 14 1998; May 7, 8 and June 11, 1999. A copy of the Botanical Resources Analysis is in Appendix E of this document. All proposed units were visited at least once during those times. These visits were intended to determine Natural Plant Community types and to survey for all Federally Threatened and Endangered, Regionally Sensitive, and Forest Concern plant species that may occur within the analysis or project areas. In addition, previous botanical surveys that were conducted in the analysis area were used. These surveys are: "Inventory of Natural Areas of the French Broad Ranger District" (Heiman et al. 1995), botanical surveys conducted for the Preacher Timber Sale (Danley 1998), and Cold Springs White Pine Salvage (Danley 1992).

**Issue F1:** Timber harvesting may threaten sensitive plants (including mycorrhizal fungi and epiphytes) by drying out moist microclimates and facilitating the incursion of exotic plant species.

The general potential effects to plant species (including Federally endangered, proposed endangered, threatened (T&E), Forest Service Sensitive (S) and Forest Concern (FC) plant species) that are exposed to logging activities such as moving heavy equipment, skidding logs, and road construction are direct impacts of damaging individual plants and the indirect effects of modifying the habitat. Some of the expected indirect effects of timber removal will initially produce an increase in light and temperature, reduce humidity, and decrease soil surface moisture. These effects may have a positive effect or negative effect depending upon the particular plant species. All natural communities exposed to logging activities will result in an earlier successional state of that community. Maintained roads would result in these areas in comparative prolonged early successional state.

This proposal will not affect any proposed or listed Federally Threatened or Endangered plant species. This proposal will not affect any Regional Forester's Sensitive plant species if all required recommendations are followed. Under Alternatives B, C, and D, this proposal may affect individuals of the Forest Concern species *Hydrophyllum maculatum* but is not likely to cause a trend towards federal listing or a loss of forest viability of *Hydrophyllum maculatum*. This proposal will have no known cumulative effects to any Federally Listed, Federally proposed, Regional Forester's Sensitive or Forest Concern plant species.

It is expected that there will be a temporary increase of ruderal (weedy) species of plants. These species are often prevalent during the initial stages of succession. This

is particularly true near constructed roads and log landings. A high percentage of these ruderal species are non-native. There are 124 species of non-native plants documented to occur on the Pisgah and Nantahala National Forests (Danley and Kauffman, 2000). An increase of non-native plant species in the proposed activity area is expected. Many of these species, both native and non-native, have benefits for wildlife and erosion control. However, as succession progresses, most ruderal species tend to become much less prevalent and generally do not persist in the area. Most ruderal plant species are expected to decrease to non-significant population levels within ten years after the initial disturbance.

Out of the 124 species of non-native plants known to occur on the Pisgah and Nantahala National Forests, 11 of these are currently recognized as having aggressive invasive qualities that can dominate local communities (Danley and Kauffman). Four of these 11 Forest Invasive species are found within the botanical analysis area. The Regional Forester's (May 2001) list of invasive exotic species includes 27 species on the Forest and 8 within the analysis area. The proliferation of these species can have a devastating and long lasting effect on natural communities and native species. Two species of invasive non-native plants, *Miscanthus sinensis* and *Paulownia tomentosa* were detected in areas that could invade new areas.

Currently, *Miscanthus sinensis* and *Paulownia tomentosa* populations are confined to areas along roads and near two stands. Untreated, this population is expected to rapidly expand. Three other species of invasive plant (*Microstegium vimineum*, *Rosa multiflora* and *Lonicera japonica* (Japanese honeysuckle)) were detected in the analysis area. The invasive plants *Microstegium vinineum*, *Rosa multiflora* and *Lonicera japonica* are so well established in the lower parts of the analysis area that control by any currently known method is entirely impractical. It is not known what effect, if any, this proposal will have on the populations of *Microstegium vinineum*, *Rosa multiflora* and *Lonicera japonica* within the analysis area.

**Table 2: Summary of Exotic Invasive Plants in the Botanical Analysis Area.**

SPECIES	CATEGORY	MAJOR AREAS OF INFECTION	CONTROL METHODS	EFFECTS OF ACTION PROPOSAL
<i>Alliaria petiolata</i>	Regional 1	Coves near Cold Springs	Clean logging equipment prior to entry	Unknown
<i>Coronilla varia</i>	Regional 2	Roadsides	no control recommended	Not expected to be invasive
<i>Festuca elatior</i>	Regional 1	Wildlife Fields	no control recommended	Not expected to be invasive
<i>Lespedeza cuneata</i>	Regional 1	Roadsides	no control recommended	Not expected to be invasive
<i>Lonicera japonica</i>	Regional 1 Forest Invasive	Wildlife Fields, coves near Cold Springs	Clean logging equipment prior to entry	May increase
<i>Miscanthus sinensis</i>	Regional 2 Forest Invasive	Roadsides	Control recommended before logging activities proceed	Not expected to increase with recommended control
<i>Microstegium vimineum</i>	Regional 1 Forest Invasive	Bottom Coves near Cold Springs	Generally established in coves no treatment known to be effective	May increase
<i>Paulownia tomentosa</i>	Forest Invasive	Roadsides	Control recommended before logging activities proceed	Not expected to increase with recommended control
<i>Rosa multiflora</i>	Regional 1 Forest Invasive	Wildlife Fields, roadside	Clean logging equipment prior to entry	May increase

**Issue F2:** The Hurricane Ridge and Fall Branch Significant Natural Heritage Areas, as designated by the North Carolina State Heritage Program, are located in the Hurricane Analysis Area and may be impacted by the proposed activities.



There are three proposed North Carolina natural “inventory areas” within the analysis area. These inventories were conducted by the North Carolina Natural Heritage Program (NCNHP) and published in “A Natural Areas Inventory of Haywood County, North Carolina” (Oakley, 1996). In the Pigeon River Gorge area, the Haywood County publication draws extensively from a previous work entitled “Inventory of Natural Areas of The French Broad Ranger District” (Heiman, 1995). These inventory natural areas are: Hurricane Ridge, Fall Branch and Cold Springs Bog. These areas are described in detail (Oakley, 1996) and their botanical significance given. The Hurricane Ridge and Fall Branch inventory areas could be impacted by this proposal. The possible impacted areas to these natural areas inventory sites are given below. The unpublished maps of the extent of these areas were provided by Shawn Oakley of the NCNHP.

In a statement of significance, Ann Prince (NCNHP) commented: “The North Carolina Natural Heritage Program compiles the N.C. Department of Environment and Natural Resources' list of significant "Natural Heritage Areas" as required by the Nature Preserves Act (NCGS Chapter 113A-164 of Article 9A). The list is based on the program's inventory of the natural diversity in the state. Natural areas (sites) are evaluated on the basis of the occurrences of rare plant and animal species, rare or high quality natural communities and special animal habitats. The global and statewide rarity of these elements and the quality of their occurrence at a site relative to other occurrences determine a site's significance rating. The sites included on this list are the best known representatives of the natural diversity of the state.” (Prince, pers. comm.).

**Hurricane Ridge Site:** 394 acres are within this Inventory site. Alternatives B, C, D and E propose designating 220 acres of this site as future old growth. Possible proposal activity areas do not affect this natural inventory site. The southern edge of proposed stand 7 of Compartment 457 is the northern edge of this natural inventory site. The site boundaries were modified, in coordination with Shawn Oakley of NCNHP, during January 1999 to exclude several previously harvested areas.

**Fall Branch Site:** This site is 145 acres. Stand 28 of Compartment 452 (6 acres) is within the Fall Branch natural inventory area. This stand has been previously harvested by the group selection or thinning method. Alternatives B, C, D and E propose designating 100 acres of this site as future old growth. Alternatives (B, C, and D) that contain this stand may effect the Fall Branch natural inventory area. It has been proposed by field botanists Shawn Oakley and David Danley that the 6 acres that are within the Fall Branch Natural Area that has been previously cut be excluded from the proposed Fall Branch natural area. However, at the time of this writing, this proposed change had not been formally accepted by the Natural Heritage Program. This suggested modification of the Natural area boundary would eliminate any conflict of any of the proposed actions.

**Cold Springs Bog site:** This site contains 100 acres. There will be no effect to this inventory area. No activities are proposed in this area.

**Issue F3:** The proposed treatments may negatively affect populations of *Silene ovata* located near the activity areas.

*Silene ovata*, a Regional Forester's Sensitive plant species, is known to occur near the proposed activity area. Local populations of *Silene ovata* are known from near the crest of Hurricane Ridge near stands 457/17 and 458/11. These are small populations of about 20 individuals scattered over about one-tenth of an acre in stand 457/17 and about 37 individuals in about ½ an acre near stand 458/11. In addition to these populations, there may be a third population of *Silene ovata* in the botanical analysis area found by botanist Allen Smith during the Haywood County surveys (1994). This population was unsuccessfully searched for during the 1998 surveys in all proposed activity areas. If this population is present in the analysis area, it is likely outside the proposed activity areas.

Because of the small populations of *Silene ovata*, the unmitigated direct effects of logging activities may have an adverse impact to individual plants and the population viability of *Silene ovata*. However, *Silene ovata* is known to be an early to mid successional species with favorable effects from canopy gaps or tree removal. Therefore, indirect effects of logging may be beneficial to the existing populations. Indeed, both of the known populations of *Silene ovata* within the analysis area are very close to or within past logged areas.

All known *Silene ovata* populations are excluded from the proposed activities. This will avoid all undesirable direct effects to *Silene ovata*. A 30-foot buffer is recommended around all known populations of *Silene ovata* that are near proposed activity areas. This buffer is meant to exclude all timber harvesting and road construct activities including felling and skidding directly near the known populations. This would greatly reduce the risk of undesirable and accidental direct effects to *Silene ovata*. The buffer will be maintained during all phases of project implementation.

If an alternative (Alternatives B, C, and D) is selected that would allow tree removal near the known populations of *Silene ovata*, the indirect effects of tree removal would be beneficial to these populations. It is proposed that a "slash down" be completed around the population of *Silene ovata* near stand 458/17. *Silene ovata* is well known to favor an open or partially open canopy. Therefore, any alternative selected that would remove trees near the known *Silene ovata* populations would be beneficial.

**Table 3: Summary of Effects by Alternative and Botanical Issue**

Issue	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Impacts to S. & FC. plant species	None	Direct and indirect to <i>Hydrophyllum macrophyllum</i> . Local population will remain viable.			None
Exotic plant species spreading	None	Slight increase	Slight increase	Slight increase	None
Impacts to NCNHP natural areas	None	6 acres of Fall Branch Natural Area	6 acres of Fall Branch Natural Area	6 acres of Fall Branch Natural Area	None

#### 1.7.7 Wildlife Resources (Issue G)

Sandy Florence, Forest Service Wildlife Biologist, and others conducted wildlife habitat surveys of the proposed wildlife project and analysis areas during 2000, 2001, and 2002. A copy of this Wildlife Resources Analysis (WILDA) is in Appendix E of this document. The surveys consisted of habitat and species surveys within the wildlife analysis area. These surveys included snail surveys, salamander surveys, cerulean warbler surveys, bog turtle habitat surveys, and surveys for the sensitive species *Melanopus sp.*. In addition, surveys conducted for other purposes were used in this analysis including: neotropical migratory birds surveys in the area, bat surveys at the confluence of Cold Springs Creek and the Pigeon River, and butterfly surveys conducted with the Cold Spring Creek and SR 1182 corridors.

**Issue G1:** The impact of cowbird parasitism and predation to forest interior birds should be prominently considered.

There have been no records of cowbird presence within the analysis area or French Broad unit of the Appalachian Ranger District during any Region-8 Bird point monitoring or the Clemson University bird study. This species is known to enter forest bird community habitat where multiple, large, agricultural pastures are present adjacent to forests.

**Issue G2:** Timber Stand Improvement (TSI) proposed in the Hurricane Analysis Area may result in the potential loss of soft mast including grape vines.

The manual TSI treatments proposed for all action alternatives within existing early successional stands will involve the clipping of grape vines in direct competition with selected trees. The selection of trees will be done within the stands specified on a 20' x 20' spacing. While the clipping of the competing grape vines will set their growth and grape production back, this small amount of actual treatment area will not affect the soft mast and vine thickets preferred by ruffed grouse and other species.

**Issue G3:** The project may impact the Carolina northern flying squirrel and potential nesting habitat for this species.

The preferred habitat for this species is high elevation spruce-fir and northern hardwoods forest types above 4000 feet in elevation. There are no spruce-fir or northern hardwood forest types located within the Hurricane Analysis Area. Therefore, there will be no effects to the Carolina northern flying squirrel or its habitat from this proposed project.

**Issue G4:** The proposed project may impact the following species: Southern Appalachian woodrat, long-tailed shrew, southern water shrew, Indiana bat, northern myotis, southern rock vole, Cooper's hawk, blackbilled cuckoo, yellow-bellied sapsucker, warbling vireo, Weller's salamander, other terrestrial gastropods and invertebrates, cerulean warbler, and bog turtle.

The Wildlife Analysis (WILDA) evaluated all Federally Threatened and Endangered, Regionally sensitive, or Forest Concern wildlife species that could occur within the analysis area. A list of the species eliminated from further analysis and the reason elimination are included in Appendix A of the WILDA. These species include: *Myotis sodalis* (Indiana bat), yellow-bellied sapsucker, Weller's salamander, and numerous gastropods and invertebrates. The following were considered but are either not found in or are not considered rare within the analysis area: long-tailed shrew, northern myotis, Cooper's hawk, black-billed cuckoo, and warbling vireo.

The following species were evaluated in the WILDA and the results of the analyses are given (see the WILDA located in Appendix E for additional details of analyses):

**Southern Appalachian woodrat, *Neotoma floridana haematoreia*, (Forest Concern):** This species utilizes moist conditions but are known in both dry and moist sites. During active road construction and timber harvest, there may be a short-term disruption of the animals travel patterns and feeding habitats. Therefore, Alternatives B and C may indirectly affect the species while Alternatives A, D, and E will not have any direct, indirect, or cumulative effects to this species.

**Southern water shrew, *Sorex palustri punctulus*, (Regionally sensitive):** There will be no direct, indirect, or cumulative effects to the water shrew or its habitat by the implementation of any alternative considered.

**Southern rock vole, *Microtus chrotorrhinus carolinensis*, (Regionally sensitive):** Alternatives B and C will result in negative indirect effects to the habitat of the southern rock vole and will change the use of the immediate road bed. Due to the low likelihood of occurrence of the species in this minimal habitat and the mobility of the vole, no direct effects to individuals or the population is expected. Negative cumulative effects to the rock vole habitat will be limited to the portion of the new road construction that crosses the rock/boulder area and there will be no cumulative effect to the population. There will be no direct, indirect, or cumulative effects to the southern rock vole population by Alternatives A, D, or E.

**Bog Turtle, *Clemmys muhlenbergii*, (Federally threatened):** There will be no direct, indirect, or cumulative effects to the Bog turtle or its habitat by any alternative considered in this EA.

**Cerulean warbler, *Dendroica cerulea*, (Forest Concern):** Bird surveys have been done extensively within the analysis area. Clemson University has surveyed the area for several years and Rod McClanahan has completed surveys for the past four years. No Cerulean warblers have been found. Suitable habitat exists in Compartment 457, stand 7; therefore, Cerulean surveys were completed by Sandy Florence and Dennis Helton, utilizing Dr. D. Buehler's cerulean survey protocol. No Cerulean's were found during this survey effort; therefore, there will be no effects to this species by any alternative considered.

**Issue G5:** The use of herbicide in the project area may have negative impacts to wildlife in the project area.

The use of Garlon 4 and Garlon 3A, whose active ingredient is triclopyr, is proposed for advance oak treatment on between 50 and 125 acres in Alternatives B, C, and D. Accord, whose active ingredient is glyphosate, has been proposed for conversion of 12 acres of wildlife fields in Alternatives B, C, and D. Control of non-native invasive species on less than an acre with herbicides, whose active ingredient is either triclopyr or glyphosate, has been proposed in Alternatives B, C, and D. Manual cutting methods would be used to control these species where they occur within 100 feet of water. Herbicides would be applied according to the labeling information and the site-specific analysis done for each area where it is applied. Herbicides would be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health.

Garlon 4 is moderately toxic to fish and aquatic invertebrates on an acute basis. Garlon 3A is slightly toxic to aquatic organisms on an acute basis. Aquatic population and habitats will be protected through implementation of the applicable

mitigation measures contained in the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989.

Glyphosate, the active ingredient in Accord, has been rated very low for its toxicity to wildlife. Studies have shown that, when properly applied to natural ecosystems, glyphosate will not cause adverse effects on wildlife health, feeding habits or distribution. Scientific data have shown that glyphosate does not bioaccumulate. A series of studies have clearly shown that glyphosate is very slowly absorbed across the gastrointestinal membrane and that there is minimal tissue retention and rapid elimination of glyphosate residues from several animal species. The lack of retention and the rapid elimination of glyphosate from animals indicates that even in the event of repeated exposure, glyphosate will not accumulate in the body or food chain.

A risk assessment has been completed on the use of glyphosate and can be found in the Final Environmental Impact Statement for Vegetative Management in the Appalachian Mountains (VMAM). The risk assessment found that deer browsing on vegetation with residual chemical were not adversely affected. No direct effects on small mammals or adverse effects to reproduction, growth, or survival were observed. At high doses, glyphosate was slightly toxic to birds but reproduction was not affected. Adverse effects may occur, if large areas are treated, to local populations of small mammals, birds, and terrestrial amphibians and reptiles.

Populations of larger mammals, birds, and domestic animals present are not likely to be affected at all by glyphosate. Although not all wildlife species were assessed and insects were not addressed, consideration was given to the worse case scenario of direct application of herbicide onto various species. Direct application of herbicide onto insects within the grass layer or indirect contact from the ground or grass, may result in individual mortality. All guidelines and specifications within the VMAM will be followed for the herbicide application proposed activity.

**Issue G6:** This project may adversely impact neotropical migratory songbirds, salamanders, and plant species that depend on large unfragmented tracts of mature forest.

The Wildlife Analysis (WILDA) discusses overall effects to bird populations. Several neotropical migratory bird species are included in that discussion. They include cerulean warbler, solitary vireo, ovenbird, and northern parula. Cerulean warbler is discussed as a Forest Concern species (See Issue G4 above). The other species are discussed as part of the Management Indicator Species (MIS) discussion (Issue G7).

The maximum area of treatment, Alternative C, would reduce the mature forest within the AA by 3.1%, therefore the gaps within the forest canopy on the overall AA, will not be significant. All action alternatives propose to do Timber Stand Improvement (TSI) treatment on 110 acres. A calculation of the actual affected area

within these stands resulted in a total of approximately 5.5 acres affected. If this treatment is done during nesting season, there is potential for ground, shrub, and some mid-story nesting birds to lose their first nest. This affect, when considering the available habitat on the entire AA, would have no effect on any bird populations.

Partners In Flight (PIF), North Carolina coordinator, Mark Johns, has stated there is a concern among many in the national PIF organization that the early successional habitat is becoming too fragmented. Birds dependent on early successional habitat are believed to be declining, in part, due to the scattered, small patches of habitat available. The mature forest continuity analysis, completed for the black bear effects analysis, depicts a clustering of early successional and field habitat that should be suitable for bird populations, dependent on early successional, to flourish. The birds dependent on mid-mature forests, with closed canopies will also flourish within the AA as 80% of this habitat would remain if the maximum regeneration proposed, Alternative C, is selected.

If harvesting activities of any action alternative are carried out during the nesting season, the affect to any bird species would be negative. Many bird species readily re-nest if their first nest is destroyed. Any approved harvesting would be done over a period of time throughout the year and would take multiple years to accomplish. Therefore, an estimated 20% of the approved harvest activity could be carried out during nesting season. Implementation of the maximum harvest alternative, Alternative C, would result in an estimated 0.5% of the bird habitat within the Hurricane Analysis Area being negatively affected.

**Issue G7:** Impacts to wildlife Management Indicator species (MIS) must be considered.

MIS represent various native and desirable non-native species and their habitat forest wide. Black bear, ruffed grouse, eastern wild turkey, and pileated woodpecker were chosen as the wildlife MIS representative of this watershed. Their population changes are believed to indicate the effects of management activities on wildlife. See the WILDA located in Appendix E for details of MIS analyses. In addition, an MIS analysis is included in Appendix G of the EA.

The effects to black bear, ruffed grouse, and eastern wild turkey are discussed in Chapter 3, Affected Environment and Environmental Consequences, of this document.

**Pileated Woodpecker:** Alternatives A and E will increase the number of available large cavity trees as the forest continues to age, while the harvest alternatives will decrease potential suitable cavity trees; Alternative B by 133 acres; Alternative C by 224 acres; and Alternative D by 149 acres. The proposed actions of thinning and prescribe burning stand 457/17 in Alternative B, C and D and stand 458/6 in Alternative B, may decrease the amount of foraging habitat where small stem trees

are removed and the residual trees are released to increase in canopy size. All of the additional actions proposed, would have no affect on the Pileated Woodpecker population.

**Issue G8:** Recreational use of the Hurricane Analysis Area may be impacting the wildlife resources in the project area.

It has been documented that increased recreation use around wildlife improvements such as wildlife fields and linear wildlife openings decreases the value of these improvements to wildlife. Currently, conflicts between recreation use and wildlife resources are occurring within the Hurricane analysis area. There are treatment proposals included in this document that create additional wildlife habitat, improve existing wildlife habitat, and reduce conflicts between recreation and wildlife resources (Alternatives B, C, and D). Existing conflicts would continue under Alternative A and to a lesser extend in Alternative E. There are no proposals being made that are expected to increase conflicts between recreation and wildlife resources.

**Issue G9:** Logging within a black bear sanctuary may cause black bears to leave the sanctuary and increase their risk of mortality.

The overall affect to Black Bear or its habitat will be minimal for all alternatives considered. See the discussion for effects of the project on black bear in Chapter 3, Affected Environment and Environmental Consequences, of this document.

**Issue G10:** Road construction may negatively impact black bear by increasing the open road density of the area.

The road proposed for construction under Alternatives B and C would remain closed to public traffic after construction. Therefore, there would be no increase in the open road density from any alternative as a result of this project.

#### 1.7.8 Old Growth (Issue H)

**Issue H:** Old growth opportunities should be evaluated independently of potential timber sales.

The Forest Plan calls for a minimum of 5% of each compartment that is not already part of an old growth area or "patch", to be designated for old growth management. There are no large or medium patches located within the Hurricane Analysis Area. According to Amendment 5 of the Forest Plan, the purpose of the small patches is to increase biological diversity and provide structural components of old growth at the



stand and landscape levels. Old growth is usually first described by stand age, but other factors such as location, size of trees, understory components, and adjacent stands are also considered.

Currently, Four areas (346 acres) in the analysis area are designated as “small patch” old growth areas. All of these areas may not currently meet the definition of “old growth”; however, they have been designated to provide for future old growth as they age and develop more characteristics of old growth. These currently designated areas are described as follows:

- Compartment 452 stands 18 and 19 (77 acres):  
Stand 18 is low quality chestnut and scarlet oak about 84 years old  
Stand 19 is dominated by white oak, red oak, and hickory and is about 74 years old  
Both stands are located in Management Area 3B
- Compartment 453 stands 20 and 21 (27 acres):  
Both stands are sparse chestnut and scarlet oak with heavy bear use and about 77 years old  
Both stands are located in Management Area 4C
- Compartment 454 stands 15, 16, 17, and 18 (125 acres):  
Stand 15 has prominent rock outcroppings,  
All stands are heavily used by bear  
Stand composition in all stands is a mixture of white, red, scarlet and chestnut oaks, and stand ages range from 94 to 98 years old  
All stands are located in Management Area 4C
- Compartment 457 stands 1, 18, 24, 25, 27, and 33 (117 acres)  
Stand 1 is dominated by low quality timber predominately chestnut and scarlet oaks and yellow pine and is about 96 years old  
Stand 24 is low quality pole timber stand that is about 61 years old and is located among the other stands in this old growth patch  
Stand 18 is a white oak, red oak, hickory stand about 115 years old  
Stands 25, 27, and 33 are mature upland oak stands about 111 years old  
All stands are located in Management Area 4C

Approximately 386 acres would be designated as future old growth in Compartments 452, 456, 457 and 458 under Alternatives B-E. Table 4 summarizes the existing areas designated for future old growth and proposed future old growth areas.

**Table 4: Summary of Existing Old Growth Areas and Old Growth Areas Proposed under Alternatives B - E**

<b>Comp.</b>	<b>Total Comp Acres</b>	<b>Existing Old Growth (acres)</b>	<b>% of Comp</b>	<b>Proposed Old Growth (acres)</b>	<b>% of Comp</b>	<b>Total Old Growth (acres)</b>	<b>% of Comp</b>
<b>452</b>	<b>1,284</b>	77	6.0%	100	7.8%	177	13.8%
<b>453</b>	<b>1,110</b>	27	2.4%	0	0%	27	2.4%
<b>454</b>	<b>842</b>	125	14.8%	0	0%	125	14.8%
<b>456</b>	<b>908</b>	0	0%	110	12.1%	110	12.1%
<b>457</b>	<b>816</b>	117	14.3%	110	13.5%	227	27.8%
<b>458</b>	<b>961</b>	0	0%	66	6.9%	66	6.9%

#### 1.7.9 Economic Considerations (Issue I)

**Issue I:** This proposal may have adverse economic impacts as a result of the loss of forested acres.

The areas proposed for timber harvest represent between 1.4% (Alternative B) and 2.4% (Alternative C) of the total project area. Therefore, it is highly unlikely that it would cause adverse economic impacts to the area.

The timber sale economics of this proposal are addressed by conducting a financial efficiency analysis. This analysis compares estimated Forest Service expenditures with estimated financial revenues. In addition to Haywood County, other counties adjacent to Haywood County could be affected by a timber sale in the Hurricane area. These counties have agrarian based economies with textile and tourist industries also playing an important role.

Forest Service management activities affect a broad spectrum of industries, including tourism, trade, manufacturing, and service. Timber harvesting may affect these industries; however, information on the effect it has on industries other than timber is limited. Some recreation activities such as using scenic overlooks, hunting and wildlife viewing benefit from vegetative management activities, but it is difficult to quantify any effect.

Financial efficiency is a way to evaluate how well resources are used to produce benefits. The financial efficiency analysis for the proposed alternatives considers cost incurred and benefits accrued through the implementation of the alternatives. The measure of quantifiable benefits and costs is present net value (PNV), which is the present value of benefits minus the present value of costs. The benefit/cost ratio relates the benefits derived from an activity to the cost of implementing the activity. A benefit/cost ratio equal to one has equal benefits and costs. Costs exceed benefits if

the ratio is less than one and benefits exceed costs if the ratio is greater than one. The assumptions used to calculate the PNV's for all alternatives are in the Financial Efficiency Analysis and Economic Assumption report that can be found in Appendix F along with the PNVs and benefit cost ratios for Alternatives B-E.

#### 1.7.10 Recreation (Issue J)

**Issue J:** Road construction may further degrade the recreational value of the area for those using the Harmon Den Campground.

Road construction is proposed in Alternatives B and C. This approximately 3200 feet of new road would be located internal to the project area and will be gated and used for administrative purposes only. There would be no additional vehicle traffic created by this road construction. Therefore, it is not expected to have an effect on the recreational value of the area.

#### 1.7.11 Health and Safety (Issue K)

**Issue K:** The use of glyphosate (Roundup) may cause unknown or unwanted health effects to humans and wildlife.

Roundup would not be used in any of the proposed treatments. Accord, which contains the same active ingredient, glyphosate, as Roundup, is proposed for use. Accord would be applied according to the labeling information and specific treatment where it is applied. Herbicides would be applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health.

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to glyphosate (the active ingredient in Roundup and Accord). Occupational exposure to this material has not been reported to cause significant adverse human health effects. On the basis of available information, exposure to herbicides whose active ingredient is glyphosate is not expected to produce significant adverse human health effects when labeling and application directions are followed and safety recommendations are implemented.

Notice signs will be posted in areas of anticipated public use where herbicide has been applied. The signs will include information on the herbicide used, when it was applied, and who to contact for additional information. All applicable mitigation measures contained in the Vegetation Management in the Appalachian Mountains (VMAM) FEIS issued in July 1989 will be followed. An Emergency Spill Plan that outlines procedures to be followed in the event of an accidental spill is included in Appendix H.

## 1.8 Issues Beyond the Scope of this Analysis

The Hurricane Interdisciplinary Team (IDT) has determined that the following issues are beyond the scope of this Environmental Assessment.

### 1.8.1 Logging on National Forest system lands

**Issue AA:** Logging is an inappropriate use of public forests

**Reason this Issue is Beyond the Scope of this Analysis:** Timber harvesting is a legitimate use of national forest land as set forth by laws that regulate Forest Service activities. The Forest Plan for the Nantahala and Pisgah National Forests identifies areas where timber harvesting is an appropriate activity in accordance with rules and regulations based on these laws. The decision to harvest or not harvest timber in the Hurricane project area at this time will be decided based on this analysis.

### 1.8.2 Timber Theft

**Issue BB:** The issue of timber theft needs to be addressed.

**Reason this Issue is Beyond the Scope of this Analysis:** Timber theft is an illegal activity on national forest lands. The investigation of timber theft is a function of the Law Enforcement division of the Forest Service.

### 1.8.3 Global Warming

**Issue CC:** Prescribed burning may affect global warming.

**Reason this Issue is Beyond the Scope of this Analysis:** The level of analysis for this issue would be at the national and international level and not at this site-specific project level.



## 2.0 ALTERNATIVES

### 2.1 Introduction

The Alternatives Chapter is the heart of the Environmental Assessment. This chapter describes five alternatives: Alternative A - No Action, Alternative B - Meets Minimums Established by the Forest Plan, Alternative C - Early Successional Habitat Emphasis, Alternative D –Long-term Oak Reproduction Emphasis with No New Roads, and Alternative E – Late Successional Species Emphasis. Based on information and analysis presented in Chapter 3.0 Affected Environment and Environmental Consequences, this chapter in section 2.6 presents the environmental effects in summary form, providing a clear basis for choice among the alternatives for the decisionmaker and public.

This chapter has these five major sections:

- Descriptions of Proposed Treatments
- Alternatives Considered
  - ❑ Alternative A: No Action
  - ❑ Alternative B: Meets Minimums Established by the Forest Plan
  - ❑ Alternative C: Early Successional Habitat Emphasis
  - ❑ Alternative D: Long-term Oak Reproduction Emphasis with No New Roads
  - ❑ Alternative E: Late Successional Species Emphasis
- Alternatives Considered But Not In Detail
- Summary Comparison of Actions
- Summary Comparison of Effects

### 2.2 Descriptions of Proposed Treatments

Several treatments are proposed in more than one alternative. The detailed descriptions below explain how these terms are being used in this Environmental Assessment (EA) and give details on how these treatments would be implemented if selected for implementation based on the analysis in this EA:

#### **Harvesting and Silvicultural Treatments**

- Regeneration harvest refers to two-age regeneration harvesting with varying leave basal areas. Specifications for residual leave trees are mast producing with large crowns and a DBH of 12 inches or greater. Residual trees would be hard mast producing species such as oak and hickory wherever possible.

- Site Preparation with herbicides is proposed to remove unmerchantable trees prior to or following completion of regeneration harvesting. Three years following completion of harvest, the regeneration units would be inventoried and monitored for achievement of stocking level and desired species composition (primarily an oak component as defined in this document). At that time, additional follow up treatments with herbicides would be implemented if the desired composition of 20% oaks has not been attained.
- Advanced oak treatment with herbicides is proposed. Application would involve thinline application directly to tree stems as well as injection of individual tree stems. Treatment of shade tolerant species (such as striped maple, sourwood, silverbell, and black gum) allows more sunlight to reach the forest floor to stimulate growth and development of species such as oaks, black cherry, white ash, and hickory for desired future stand composition.
- Timber Stand Improvement would involve the use of chainsaws to manually release tree species desirable for timber, as well as species beneficial to wildlife. Trees would be selected on a 20' x 20' spacing, and would have to be dominant or codominant in the stand, have good form, and have a healthy, vigorous crown. Only competing stems that have crowns touching these selected trees and are at least 50% the height of the selected tree would be cut (dogwoods, redbuds, and other small tree species would not be cut). Grape vines directly competing with selected saplings may also be manually clipped in this operation.

### **Road Construction**

- Existing roads, reconstructed roads, and any new roads in the project area will remain gated to prevent public motorized access for the protection of resources. Skid roads and landings would be rehabilitated by applying a seed mixture desirable for wildlife and used as wildlife openings.

### **Wildlife Habitat Improvement**

- Creation and maintenance of understory grass/forb habitat consists of mechanical slashdown of all stems 3" dbh and below; thinning to a basal area of 40-50 sq.ft./acre, where possible leaving all oak species; and prescribe burning with intense fire three times over a ten year period.
- Rehabilitation of existing wildlife openings would be done by converting these fields from a vegetative cover of fescue to warm season grasses using a combination of spraying with herbicide (Accord) and no-till seeding.
- Placing interpretive signs in the analysis area to address user conflicts between wildlife and recreation resources in the analysis area.
- Install fencing or construct a barrier to keep horseback riders and campers from entering the fields whose primary purpose is to provide wildlife habitat.

### **Botanical Treatments**

- Non-native invasive species control including Princess tree (*Paulownia tomentosa*) and *Miscanthus sinensis* is proposed in all of the action alternatives. Depending on the alternative, control would either be by herbicide spot treating or manually cutting individual plants along

access roads. Total area treated would be less than one acre. Herbicide control would be with Forest Service approved herbicides that contain triclopyr or glyphosate as active ingredients.

The following proposed treatments for Recreation and Old Growth are the same for Alternatives B, C, D, and E.

### **Recreation**

- Monitoring of the dispersed camping sites along Cold Springs Road would continue as well as rehabilitation of existing campsites and establishment of alternate dispersed camping sites in locations that will protect stream quality.

### **Old Growth Designation**

- Compartment 452: portion of Fall Branch Natural Area approximately 100 acres  
In portions of Stands 8, 26, and 28.
- Compartment 456: portion of Hurricane Ridge Natural Area approximately 110 acres  
In portions of Stands 8, 9, and 10.
- Compartment 457: portion of Hurricane Ridge Natural Area approximately 110 acres  
Stands 3, 20, 21, and 22.
- Compartment 458: adjacent to Cold Springs Creek approximately 66 acres  
Stands 23 and 24.

See Appendix D for a map showing the current and proposed future old growth areas within the analysis area.

## **2.3 Alternatives Considered**

### **2.3.1 ALTERNATIVE A: No Action**

This alternative serves as the no action alternative. No timber harvesting, thinning, silvicultural treatments, soil and water improvements, road construction, wildlife habitat improvement, or other management activity would take place in the project area.



### **2.3.2 ALTERNATIVE B: Meets Minimums Established by the Forest Plan**

Charts providing additional details concerning the treatments proposed and maps of the areas proposed for treatment follow the description of treatments in Alternative B.

The following treatments are being proposed in Alternative B:

#### **Harvesting and Silvicultural Treatments**

- Regeneration harvesting and site preparation with herbicides in six stands on approximately 133 acres.
- Commercial thinning and herbicide treatment in one stand, which is approximately 35 acres.
- Advanced oak treatment in four stands on approximately 66 acres.
- Timber Stand Improvement in four stands between 10 and 15 years old (approximately 110 acres).

#### **Road Construction**

- Approximately 3200 feet of new road construction
- Approximately 1500 feet of road reconstruction
- Approximately 1250 feet of temporary road would be needed to access the units.

#### **Wildlife Habitat Improvement**

- Creation and maintenance of understory grass/forb habitat on approximately 30 acres.
- Rehabilitation of three existing wildlife openings (12 acres).
- Wildlife field maintenance by prescribed burning is proposed for one field (13 acres).
- Two log landings are proposed for expansion and conversion to wildlife openings (3 acres). These fields would be located in Compartment/Stand 457/7 20 and 457/9 15.
- Place two interpretive signs in the analysis area and fence or barricade some of the wildlife fields in the area to reduce user conflicts.

### Botanical Treatments

- Improve habitat for the Forest Sensitive species *Silene ovata* with a non-commercial slashdown of midstory and understory beginning at the edge of the 30-foot buffer zone protecting the existing population of *Silene ovata* (456/18) and extending for a distance of 100 feet in all directions without crossing the Hurricane Ridge road. No treatment would occur within 30 feet of the existing population.
- Control non-native invasive species on less than an acre with herbicides. Manual cutting methods would be used to control these species where they occur within 100 feet of water.

The proposed treatments for Recreation and Old Growth are those described under Section 2.2, Descriptions of Proposed Treatments.

### Proposed Mitigation Measures for Alternative B:

Visual Resources: The following mitigation measures will be incorporated into Alternative B to reduce impacts to visual resources:

- ❖ Select leave trees with well-formed crowns in Units 452-13, 452-28, 457-7/20, 458-16, and 458-18.
- ❖ Leave of minimum of 20 sqft/acre residual basal area in Unit 458-18.
- ❖ Minimize clearing limits of landings and deck areas (especially where cut and fill are required) in Units 452-13, 458-16, and 458-18.
- ❖ Minimize accumulation of slash around landings by bucking logs where felled in Units 452-13 and 458-16.
- ❖ Screen new and existing roads/landings from view from the various viewpoints (except from horse trail viewpoints) in Units 452-13, 458-16, and 458-18.
- ❖ Move the upper boundary of Unit 458-16 off of ridge (at least one tree height down slope).

## ALTERNATIVE B – Harvest and Silvicultural Treatments

<b>Compartment/ Stand Number</b>	<b>Proposed Harvests</b>	<b>Logging System</b>	<b>Additional Proposed Treatments</b>	<b>Acres*</b>
452/13	Two-aged harvest 30-35 sqft/acre residual Basal Area (BA)	Cable	Site Preparation with herbicides	15
452/28	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides	35
457/7 20	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides	21
457/9 15	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides	23
458/16	Two-aged harvest 30-35 sqft/acre residual BA	Cable	Site Preparation with herbicides	16
458/18	Two-aged harvest 20-25 sqft/acre residual BA	Tractor	Site Preparation with herbicides	23
458/15	Thin to a 60-70 sqft/acre residual BA	Tractor	Release with Herbicides	35
458/2	Advanced Oak	N/A		25
458/6	Advanced Oak	N/A		5
458/8	Advanced Oak	N/A		16
458/20	Advanced Oak	N/A		20
Total			Regeneration	133
Total			Thinning	35
Total			Advanced Oak Treatment	66

\*Acreage figures are approximate.

## ALTERNATIVE B - Timber Stand Improvement Treatments

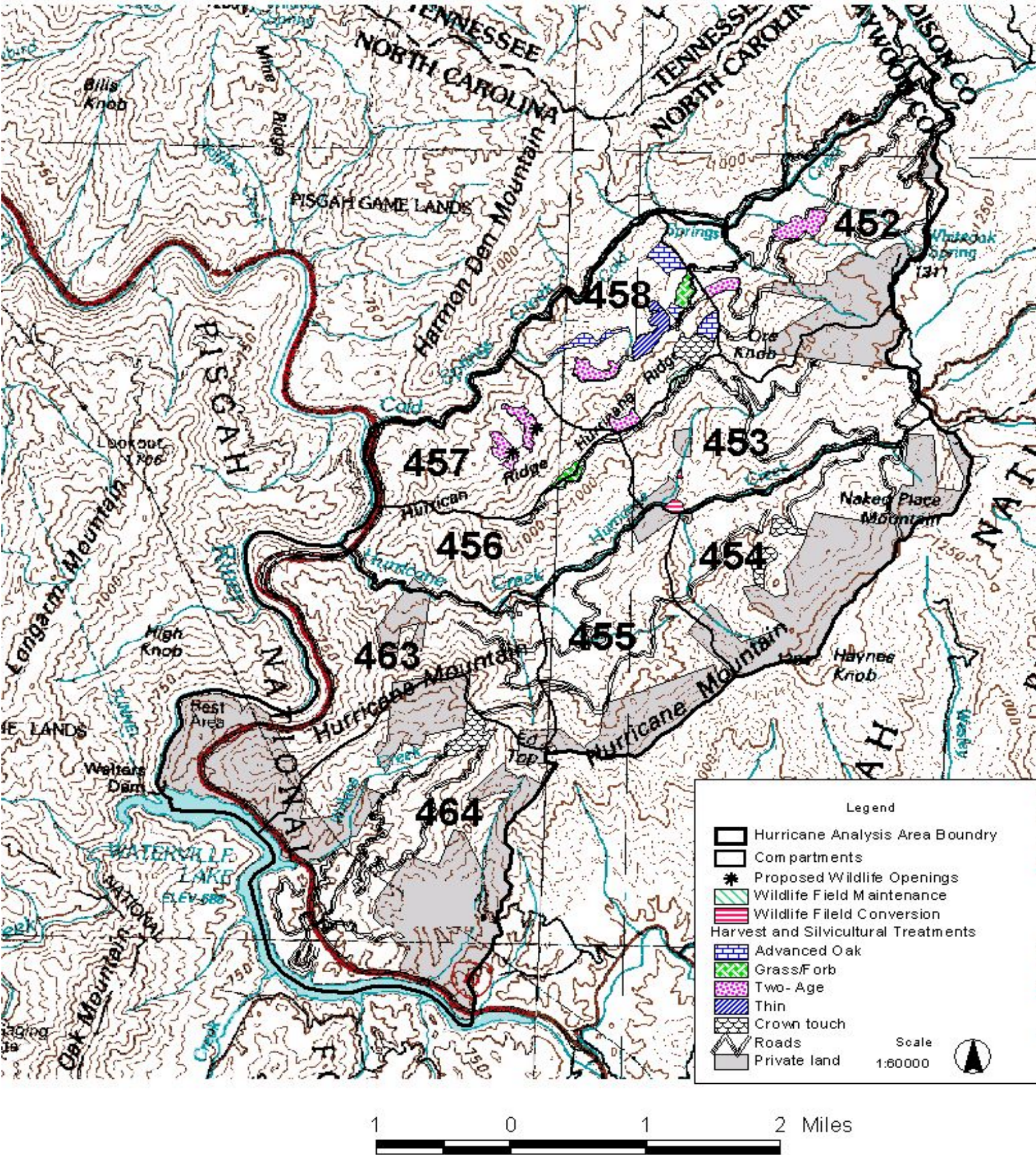
<b>Compartment/ Stand Number</b>	<b>Silvicultural Treatment</b>	<b>Acres</b>
454/31	Manual Crown Touch and Release	19
454/32	Manual Crown Touch and Release	20
458/17	Manual Crown Touch and Release	31
464/37	Manual Crown Touch and Release	40
<b>Total</b>	<b>Manual Crown Touch and Release</b>	<b>110</b>

## ALTERNATIVE B - Wildlife Treatments

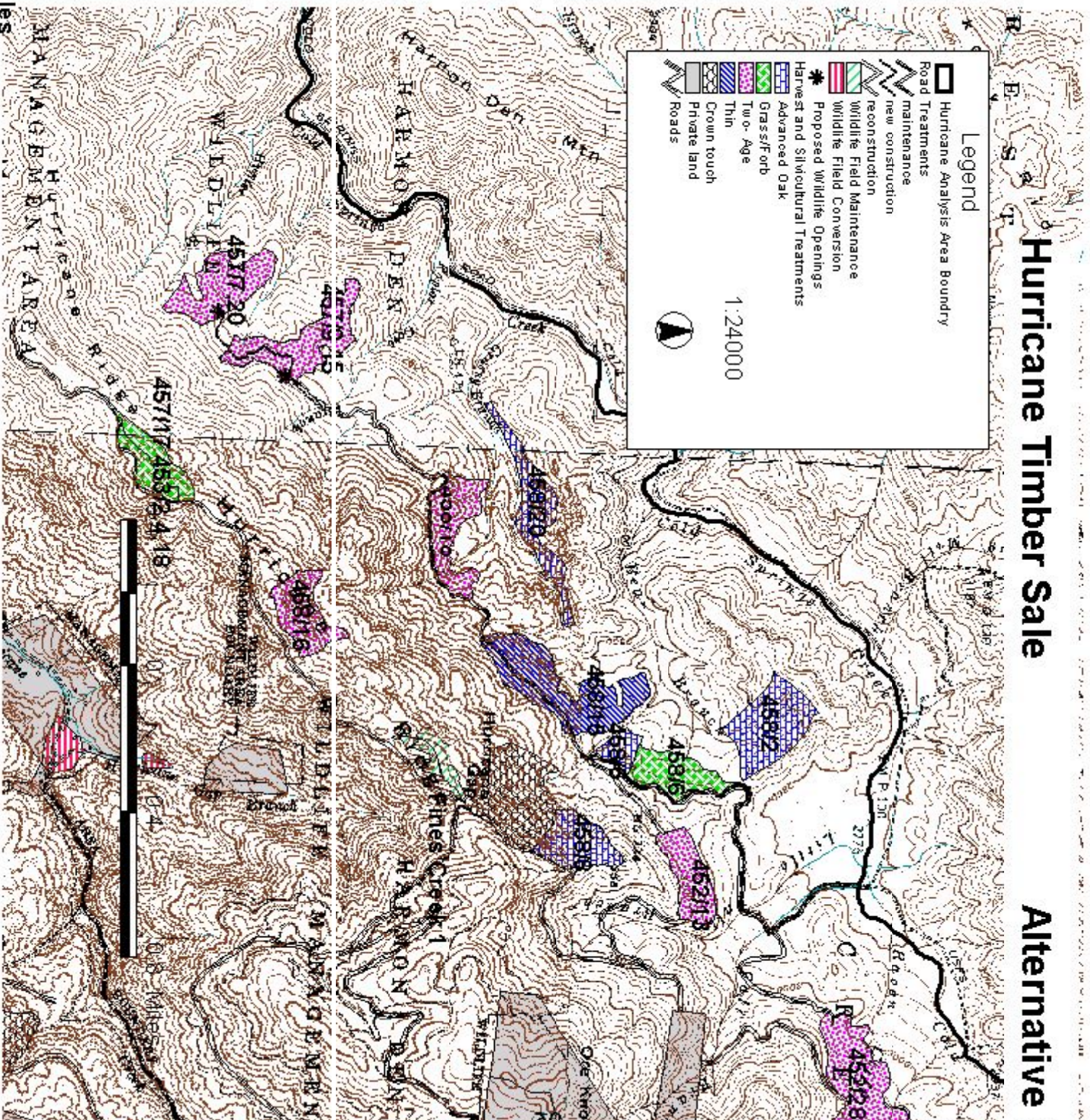
<b>Quad Name/ Field Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
Fines Creek/ 1, 4, 5	Conversion to warm season grasses with herbicide treatment	12
Fines Creek/1	Field Maintenance by Prescribed Burning	13
Fines Creek/1	Placement of interpretive signs and fence or barrier to address user conflicts between wildlife and recreation resources in analysis area	2 signs 2 barriers
<b>Compartment/ Stand Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
457/17		
456/2 4 18	Grass/Forb Treatment	15
458/6	Grass/Forb Treatment	15
457/7 20		
457/9 15	Creation of wildlife openings by expansion of log landings in timber sale	3



# Hurricane Timber Sale      Alternative B









### **2.3.3 ALTERNATIVE C: Early Successional Habitat Emphasis**

Charts providing additional details concerning the treatments proposed and maps of the areas proposed for treatment follow the description of treatments in Alternative C.

The following treatments are being proposed in Alternative C:

#### **Harvesting and Silvicultural Treatments**

- Regeneration harvesting and site preparation with herbicides in ten stands on approximately 224 acres.
- Supplemental planting of improved northern red oak seedlings would take place the year following harvest in eight stands on approximately 183 acres.
- Advanced oak treatment in three stands on approximately 50 acres.
- Timber Stand Improvement in four stands between 10 and 15 years old (approximately 110 acres).

#### **Road Construction**

- Approximately 3200 feet of new road construction
- Approximately 1500 feet of road reconstruction
- Approximately 1250 feet of temporary road would be needed to access the units.

#### **Wildlife Habitat Improvement**

- Creation and maintenance of understory grass/forb habitat on approximately 15 acres.
- Rehabilitation of three existing wildlife openings (12 acres).
- Wildlife field maintenance by prescribed burning is proposed for one field (13 acres).
- Four log landings are proposed for expansion and conversion to wildlife openings (6 acres). These fields would be located in Compartment/Stand 457/7 20, 457/9 15, and 457/17.
- Place two interpretive signs in the analysis area and fence or barricade some of the wildlife fields in the area to reduce user conflicts.

**Botanical Treatments:**

- Improve habitat for the Forest Sensitive species *Silene ovata* with a non-commercial slashdown of midstory and understory beginning at the edge of the 30-foot buffer zone protecting the existing population of *Silene ovata* (456/18) and extending for a distance of 100 feet in all directions without crossing the Hurricane Ridge road. No treatment would occur within 30 feet of the existing population.
- Control non-native invasive species on less than an acre with herbicides. Manual cutting methods would be used to control these species where they occur within 100 feet of water.

The proposed treatments for Recreation and Old Growth are those described under Section 2.2, Descriptions of Proposed Treatments.

**Proposed Mitigation Measures for Alternative C:**

Visual Resources: The following mitigation measures will be incorporated into Alternative C to reduce impacts to visual resources:

- ❖ Select leave trees with well-formed crowns in Units 452-13, 452-28, 457-7/20, 457-17, 458-8, 458-11, 458-16, and 458-18.
- ❖ Leave of minimum of 20 sqft/acre residual basal area in Units 457-17, 458-11, and 458-18.
- ❖ Minimize clearing limits of landings and deck areas (especially where cut and fill are required) in Units 452-13, 457-17, 458-8, 458-11, 458-16, and 458-18.
- ❖ Minimize accumulation of slash around landings by bucking logs where felled in Units 452-13, 457-17, 458-8, and 458-16.
- ❖ Screen new and existing roads/landings from view from the various viewpoints (except from horse trail viewpoints) in Units 452-13, 457-17, 458-8, 458-11, 458-16, and 458-18.
- ❖ Move the upper boundary of Units 457-17, 458-11, and 458-16 off of ridge (at least one tree height down slope).



## ALTERNATIVE C – Harvest and Silvicultural Treatments

<b>Compartment/ Stand Number</b>	<b>Proposed Harvests</b>	<b>Logging System</b>	<b>Additional Proposed Treatments</b>	<b>Acres*</b>
452/13	Two-aged harvest 30-35 sqft/acre residual Basal Area (BA)	Cable	Site Preparation with herbicides Supplemental Planting of northern red oaks	15
452/28	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	35
457/7 20	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	21
457/9 15	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	23
457/17	Two-aged harvest 20-25 sqft/acre residual BA	Cable Tractor	Site Preparation with herbicides  Supplemental Planting of northern red oaks	15 3  15
458/8	Two-aged harvest 30- 35 sqft/acre residual BA	Cable	Site Preparation with herbicides	16
458/11	Two-aged harvest 20-25 sqft/acre residual BA	Tractor	Site Preparation with herbicides	22
458/16	Two-aged harvest 30-35 sqft/acre residual BA	Cable	Site Preparation with herbicides Supplemental Planting of northern red oaks	16
458/18	Two-aged harvest 20-25 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	23
458/15	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	35
458/2	Advanced Oak	N/A		25
458/6	Advanced Oak	N/A		5
458/20	Advanced Oak	N/A		20
Total			Regeneration	224
Total			Supplemental Oak Planting	183
Total			Advanced Oak Treatment	50

\*Acreage figures are approximate.

## ALTERNATIVE C - Timber Stand Improvement Treatments

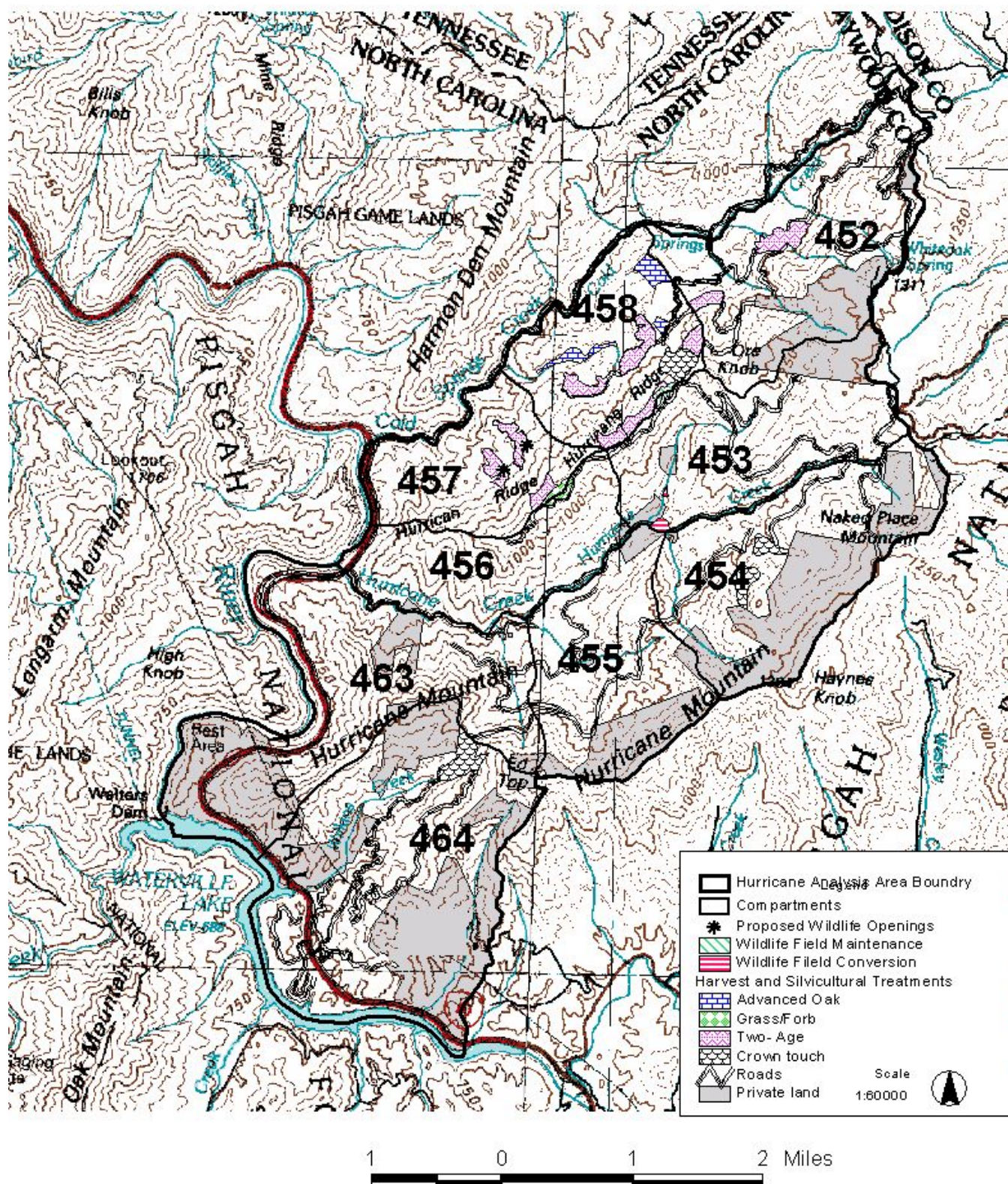
<b>Compartment/ Stand Number</b>	<b>Silvicultural Treatment</b>	<b>Acres</b>
454/31	Manual Crown Touch and Release	19
454/32	Manual Crown Touch and Release	20
458/17	Manual Crown Touch and Release	31
464/37	Manual Crown Touch and Release	40
<b>Total</b>	<b>Manual Crown Touch and Release</b>	<b>110</b>

## ALTERNATIVE C - Wildlife Treatments

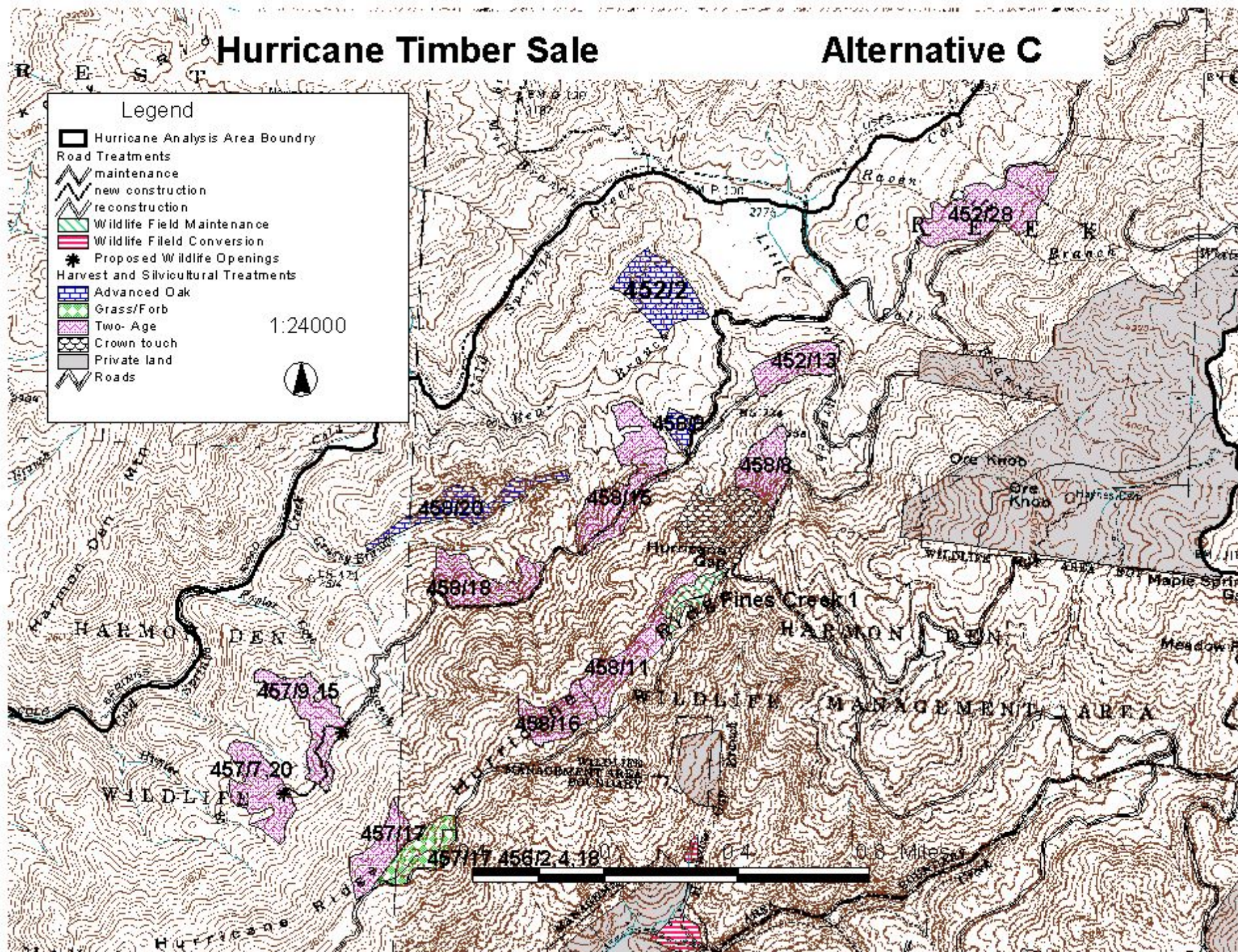
<b>Quad Name/ Field Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
Fines Creek/ 1, 4, 5	Conversion to warm season grasses with herbicide treatment	12
Fines Creek/1	Field Maintenance by Prescribed Burning	13
Fines Creek/1	Placement of interpretive signs and fence or barrier to address user conflicts between wildlife and recreation resources in analysis area	2 signs 2 barriers
<b>Compartment/ Stand Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
457/17 456/2 4 18	Grass/Forb Treatment	15
457/7 20 457/9 15	Creation of wildlife openings by expansion of log landings in timber sale	3
457/17	Creation of wildlife openings by expansion of log landings in timber sale	3



## Hurricane Timber Sale      Alternative C









### **2.3.4 ALTERNATIVE D: Long-term Oak Reproduction Emphasis with No New Roads**

Charts providing additional details concerning the treatments proposed and maps of the areas proposed for treatment follow the description of treatments in Alternative D.

The following treatments are being proposed in Alternative D:

#### **Harvesting and Silvicultural Treatments**

- Regeneration harvesting and site preparation with herbicides in seven stands on approximately 149 acres.
- Supplemental planting of improved northern red oak seedlings would take place the year following harvest in five stands on approximately 124 acres.
- Advanced oak treatment in seven stands on approximately 125 acres.
- Timber Stand Improvement in four stands between 10 and 15 years old (approximately 110 acres).

#### **Road Construction**

- Approximately 350 feet of temporary road would be needed to access the units.

#### **Wildlife Habitat Improvement**

- Creation and maintenance of understory grass/forb habitat on approximately 15 acres.
- Rehabilitation of three existing wildlife openings (12 acres).
- Wildlife field maintenance by prescribed burning is proposed for one field (13 acres).
- Two log landings are proposed for expansion and conversion to wildlife openings (3 acres). These fields would be located in Compartment/Stand 457/17.
- Place two interpretive signs in the analysis area and fence or barricade some of the wildlife fields in the area to reduce user conflicts.

**Botanical Treatments:**

- Improve habitat for the Forest Sensitive species *Silene ovata* with a non-commercial slashdown of midstory and understory beginning at the edge of the 30-foot buffer zone protecting the existing population of *Silene ovata* (456/18) and extending for a distance of 100 feet in all directions without crossing the Hurricane Ridge road. No treatment would occur within 30 feet of the existing population.
- Control non-native invasive species on less than an acre with herbicides. Manual cutting methods would be used to control these species where they occur within 100 feet of water.

The proposed treatments for Recreation and Old Growth are those described under Section 2.2, Descriptions of Proposed Treatments.

**Proposed Mitigation Measures for Alternative D:**

Visual Resources: The following mitigation measures will be incorporated into Alternative D to reduce impacts to visual resources:

- ❖ Select leave trees with well-formed crowns in Units 452-28, 457-17, 458-11, 458-16, and 458-18.
- ❖ Leave of minimum of 20 sqft/acre residual basal area in Units 457-17, 458-11, and 458-18.
- ❖ Minimize clearing limits of landings and deck areas (especially where cut and fill are required) in Units 457-17, 458-11, 458-16, and 458-18.
- ❖ Minimize accumulation of slash around landings by bucking logs where felled in Units 457-17 and 458-16.
- ❖ Screen new and existing roads/landings from view from the various viewpoints (except from horse trail viewpoints) in Units 457-17, 458-11, 458-16, and 458-18.
- ❖ Move the upper boundary of Units 457-17, 458-11, and 458-16 off of ridge (at least one tree height down slope).

## ALTERNATIVE D – Harvest and Silvicultural Treatments

<b>Compartment/S tand Number</b>	<b>Proposed Harvests</b>	<b>Logging System</b>	<b>Additional Proposed Treatments</b>	<b>Acres*</b>
452/28	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	35
457/17	Two-aged harvest 20-25 sqft/acre residual BA	Cable Tractor	Site Preparation with herbicides  Supplemental Planting of northern red oaks	15 3 15
458/11	Two-aged harvest 20-25 sqft/acre residual BA	Tractor	Site Preparation with herbicides	22
458/16	Two-aged harvest 30-35 sqft/acre residual BA	Cable	Site Preparation with herbicides Supplemental Planting of northern red oaks	16
458/18	Two-aged harvest 20-25 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	23
458/15	Two-aged harvest 15-20 sqft/acre residual BA	Tractor	Site Preparation with herbicides Supplemental Planting of northern red oaks	35
452/13	Advanced Oak	N/A		15
457/7 20	Advanced Oak	N/A		21
457/9 15	Advanced Oak	N/A		23
458/2	Advanced Oak	N/A		25
458/6	Advanced Oak	N/A		5
458/8	Advanced Oak	N/A		16
458/20	Advanced Oak	N/A		20
Total			Regeneration	149
Total			Supplemental Oak Planting	124
Total			Advanced Oak Treatment	125

\*Acreage figures are approximate.

## ALTERNATIVE D - Timber Stand Improvement Treatments

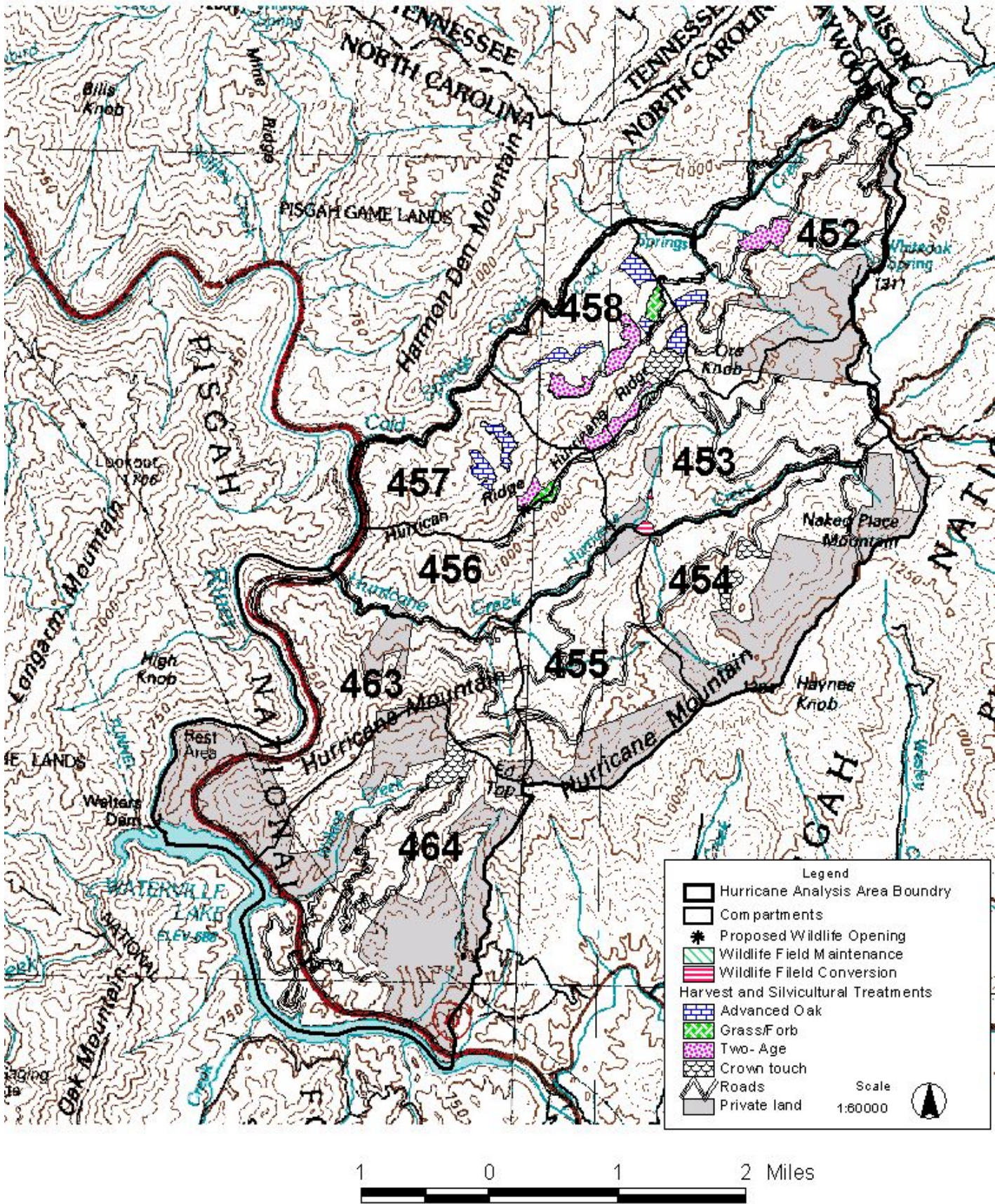
<b>Compartment/ Stand Number</b>	<b>Silvicultural Treatment</b>	<b>Acres</b>
454/31	Manual Crown Touch and Release	19
454/32	Manual Crown Touch and Release	20
458/17	Manual Crown Touch and Release	31
464/37	Manual Crown Touch and Release	40
<b>Total</b>	<b>Manual Crown Touch and Release</b>	<b>110</b>

## ALTERNATIVE D- Wildlife Treatments

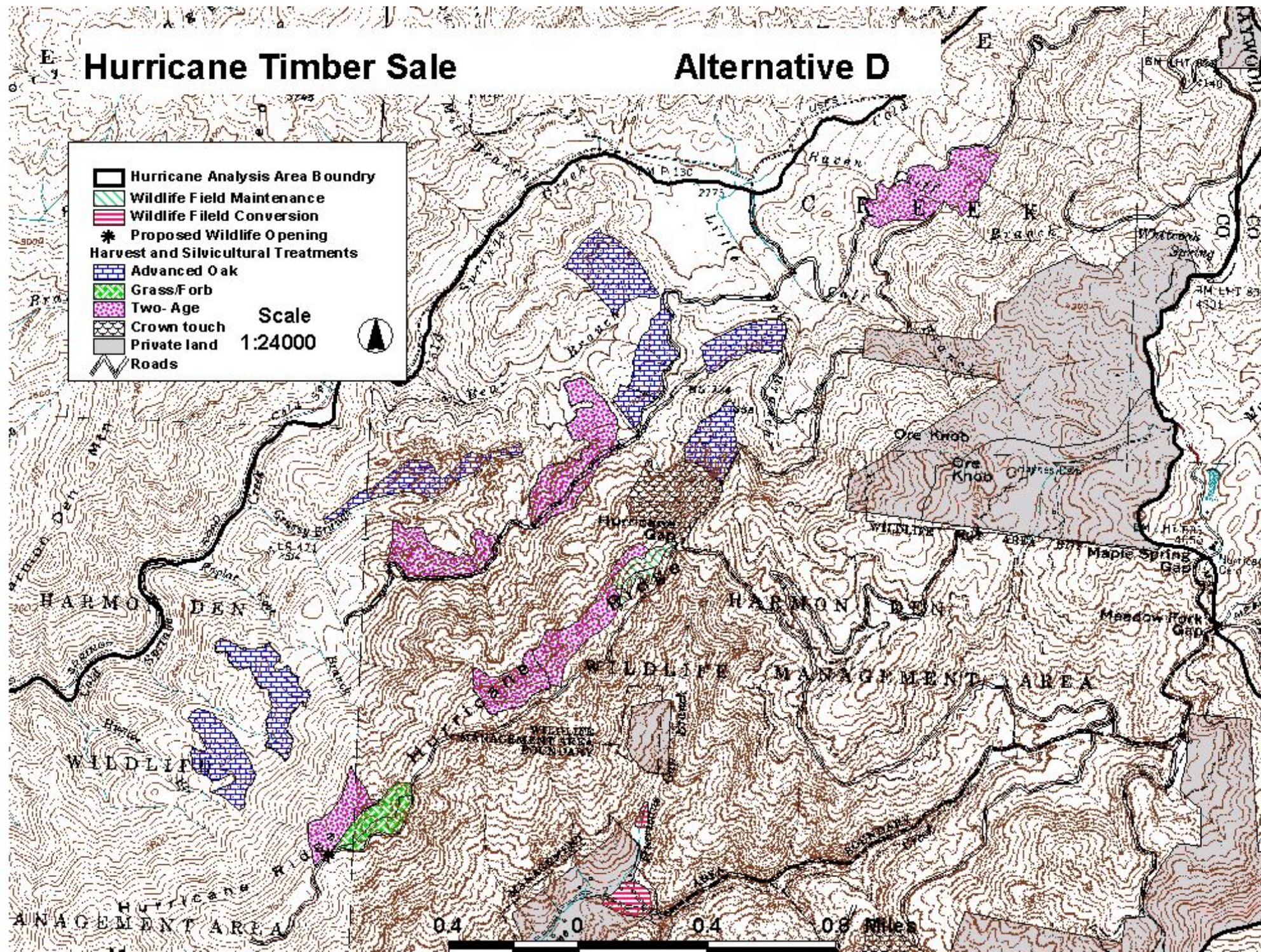
<b>Quad Name/ Field Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
Fines Creek/ 1, 4, 5	Conversion to warm season grasses with herbicide treatment	12
Fines Creek/1	Field Maintenance by Prescribed Burning	13
Fines Creek/1	Placement of interpretive signs and barrier to address user conflicts between wildlife and recreation resources in analysis area	2 signs 2 barriers
<b>Compartment/ Stand Number</b>	<b>Wildlife Treatment</b>	<b>Acres</b>
457/17 456/2 4 18	Grass/Forb Treatment	15
457/17	Creation of wildlife openings by expansion of log landings in timber sale	3



Hurricane Timber Sale      Alternative D









### 2.3.5 ALTERNATIVE E: Late Successional Species Emphasis

#### Silvicultural Treatments

- Timber Stand Improvement in four stands between 10 and 15 years old (approximately 110 acres).

#### Wildlife Habitat Improvement

- Place two interpretive signs in the analysis area and fence or barricade some of the wildlife fields in the area to reduce user conflicts.

#### Botanical Treatments:

- Control non-native invasive species on less than an acre with manual cutting methods.

The proposed treatments for Recreation, and Old Growth are those described under Section 2.2, Descriptions of Proposed Treatments.

ALTERNATIVE E - Timber Stand Improvement Treatments

Compartment/ Stand Number	Silvicultural Treatment	Acres
454/31	Manual Crown Touch and Release	19
454/32	Manual Crown Touch and Release	20
458/17	Manual Crown Touch and Release	31
464/37	Manual Crown Touch and Release	40
Total	Manual Crown Touch and Release	110

ALTERNATIVE E - Wildlife Treatments

Quad Name/ Field Number	Wildlife Treatment	
Fines Creek/1	Placement of interpretive signs and fence or barrier to address user conflicts between wildlife and recreation resources in analysis area	2 signs 2 barriers

## 2.4 Alternatives Considered But Not In Detail

An alternative was considered that would have created some grass/forb habitat by thinning and prescribed burning and would have done some other thinning. It was decided that this alternative addressed some of the needs for improved wildlife habitat; however, it did not address the issue of lack of early successional habitat. Therefore, this alternative was not considered in detail.

## 2.5 Summary Comparison of Actions

**SUMMARY OF TREATMENTS BY ALTERNATIVE**

<b>Wildlife Treatments</b>	<b>Alt. A</b>	<b>Alt. B</b>	<b>Alt. C</b>	<b>Alt. D</b>	<b>Alt. E</b>
	<b>No Action</b>	<b>Meets Forest Plan Minimums</b>	<b>Early Successional Emphasis</b>	<b>Long-term Oak Reprod Emphasis</b>	<b>Late Successional Emphasis</b>
Field Conversion		12 acres	12 acres	12 acres	0 acres
Creating New Wildlife Fields		3 acres	6 acres	3 acres	0 acres
Wildlife Field Burning		13 acres	13 acres	13 acres	0 acres
Signs and Fence or barrier		X	X	X	X
<b>Botanical Treatments</b>					
Silene ovata Treatment (Buffer, Slashdown) < 1 acre		X	X	X	
Herbicide Treatment of Grass/Pawlonia (< 1 acre)		X	X	X	
Manual Treatment of Pawlonia					X
<b>Fisheries and Soil and Water</b>					
Erosion control along dispersed camping sites along Cold Spring Road.		X	X	X	X
<b>Timber Stand Improvement (Manual)*</b>		110 acres	110 acres	110 acres	110 acres
<b>Advance Oak Treatment (Herbicide)*</b>	0 acres	66 acres	50 acres	125 acres	0 acres
<b>Supplemental Oak Planting</b>	0 acres	0 acres	183 acres	124 acres	0 acres
Regeneration Harvesting*	0 acres	133 acres	224 acres	149 acres	0 acres
Thinning*	0 acres	35 acres	0 acres	0 acres	0 acres
Grass/Forb Treatment*	0 acres	30 acres	15 acres	15 acres	0 acres
Tractor Logging*	0 acres	167 acres	177 acres	133 acres	0 acres
Cable Logging*	0 acres	31 acres	62 acres	31 acres	0 acres
Site Preparation and Follow-up Release (Herbicide)*	0 acres	133 acres	224 acres	149 acres	0 acres
<b>Roads</b>					
New Road Construction+	None	3200 feet	3200 feet	None	None
Road Reconstruction+	None	1500 feet	1500 feet	None	None
Temporary Road Construction+	None	1250 feet	1250 feet	350 feet	None

\*Acreage figures are approximate.

+Distance figures are approximate.

## 2.6 Summary Comparison of Effects

Issues	Indicators	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
<b>Issue 1: Effects on Wildlife Species Utilizing Early Successional Habitat</b>	Acres in the 0-10 year old age class in the analysis area	527 ac	660 ac +133 ac	751 ac +224 ac	676 ac +149	527 ac +0 ac
	% of analysis area in 0-10 year age class	5.6%	7.0% +1.4%	8.0% +2.4%	7.2% +1.6%	5.6% +0%
<b>Issue 2: Effects on Wildlife Species Utilizing Grass/Forb Habitat</b>	Acres by quality of grass/forb habitat in the analysis area	Good 59.2 ac	Good 93.7 ac +34.5 ac	Good 81.7 ac +22.5 ac	Good 77.2 ac +18 ac	Good 59.2 ac +0 ac
		Poor 65.4 ac	Poor 65.4 ac	Poor 65.4 ac	Poor 65.4 ac	Poor 65.4 ac
		Total 125 ac	Total 159 ac	Total 147 ac	Total 143 ac	Total 125 ac
	% of analysis area in grass/forb habitat by quality	Good 0.6%	Good 1.0 % +0.35%	Good 0.9% +0.2%	Good 0.8% +0.2%	Good 0.6% +0%
		Poor 0.7%	Poor 0.7%	Poor 0.7%	Poor 0.7%	Poor 0.7%
		Total 1.3%	Total 1.7%	Total 1.6%	Total 1.5%	Total 1.3%

Issues	Indicators	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
<b>Issue 3: Effects on Species Utilizing Late Successional Habitat</b>	Acres in the 80+ year old age class in the analysis area.	3312 ac	3281 ac -31 ac	3265 ac -47 ac	3296 ac -16 ac	3312 ac -0 ac
	% of analysis area in 80+ year age class	35.1%	34.8% -0.3%	34.7% -0.4%	35.0% -0.1%	35.1% -0%
	Acres in the 80+ year old age class in the Harmon Den Bear Sanctuary.	3938 ac	3907 ac -31 ac	3891 ac -47 ac	3922 ac -16 ac	3938 ac -0 ac
	% of Harmon Den Bear Sanctuary in 80+ year age class	26.9%	26.7% -0.2%	26.6% -0.3%	26.8% -0.1%	26.9% -0%
<b>Issue 4: Road Management</b>	Miles of road added to the existing road system	0	0.6 miles	0.6 miles	0	0
<b>Issue 5: Effects on Long-term Oak and Hard Mast Production (40+ years)</b>	Acres planted with oak seedlings to supplement the natural regeneration	0	0	183 ac	124 ac	0
	Acres of Advance Oak Treatment	0	66 ac	50 ac	125ac	0
	Total acres contributing to hard-mast production in the analysis area	5624 ac -0 ac	5549 ac -75 ac	5458 ac -166 ac	5533 ac -91 ac	5624 ac -0 ac
	% of analysis area in hard mast production	59.7%	58.9% -0.8%	57.9% -1.8%	58.7% -1.0%	59.7% -0%
	Total acres contributing to hard-mast production in the Harmon Den Bear Sanctuary	10,709 ac -0 ac	10,634 ac -75 ac	10,543 ac -166 ac	10,618 ac -91 ac	10,709 ac -0 ac
	% of Harmon Den Bear Sanctuary in hard mast production	73.3%	72.8% -0.5%	72.1% -1.2%	72.7% -0.6%	73.3% -0%

Issues	Indicators	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
<b>Issue 6: Producing a Sustainable Supply of Timber in Timber Suitable Management Areas</b>	<b>Age Class (acres)</b>					
	0-10 year age class	183	316	407	332	183
	11-20 year age class	472	472	472	472	472
	21-30 year age class	141	141	141	141	141
	31-40 year age class	106	106	106	106	106
	41-50 year age class	0	0	0	0	0
	51-60 year age class	23	23	23	23	23
	61-70 year age class	699	664	664	664	699
	71-80 year age class	1718	1651	1576	1620	1718
	81-90 year age class	1446	1415	1415	1430	1446
	91-100 year age class	270	270	254	270	270
	100+ year age class	412	412	412	412	412
	<b>Total acres</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>
<b>Issue 6: Producing a Sustainable Supply of Timber in Timber Suitable Management Areas</b>	<b>Age Class (percent of timber suitable ac)</b>					
	0-10 year age class	3.4%	5.8%	7.5%	6.2%	3.4%
	11-20 year age class	8.6%	8.6%	8.6%	8.6%	8.6%
	21-30 year age class	2.6%	2.6%	2.6%	2.6%	2.6%
	31-40 year age class	1.9%	1.9%	1.9%	1.9%	1.9%
	41-50 year age class	0	0	0	0	0
	51-60 year age class	0.4%	0.4%	0.4%	0.4%	0.4%
	61-70 year age class	12.8%	12.1%	12.1%	12.1%	12.8%
	71-80 year age class	31.4%	30.2%	28.9%	29.7%	31.4%
	81-90 year age class	26.5%	26.0%	26.0%	26.1%	26.5%
	91-100 year age class	4.9%	4.9%	4.5%	4.9%	4.9%
	100+ year age class	7.5%	7.5%	7.5%	7.5%	7.5%
	<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Issue 7: Producing a Short-term Supply of Timber in Timber Management Areas</b>	Volume of timber produced (CCF)	0	4127 CCF	5147 CCF	3337 CCF	0
	Volume of timber produced (MBF)	0	2270 MBF	2831 MBF	1835 MBF	0

## **3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

### **Introduction**

This chapter gives a brief description of the existing environment in and around the project area that may be affected by the alternatives under consideration and discussed in Chapter 2. In addition, this chapter forms the scientific and analytical basis for the comparison of alternatives as required by the National Environmental Policy Act (NEPA). Included in this chapter will be disclosure of effects of the alternatives on the different resources. Reports from different resource specialists supplied information for portions of this analysis.

The seven key issues associated with this proposed project were identified through a public participation process, which included input from Forest Service natural resource specialists, other government agencies, private groups and individuals. These seven issues were determined to be relevant to the decisions to be made concerning the Hurricane Analysis Area. Other resources and issues were eliminated from discussion in this chapter as directed by CEQ Regulation 1500.1(b), 1500.2(b) and other section because the project would only cause inconsequential effects to these issues (resources). These other issues and resources are discussed in Section 1.7 of Chapter 1 of this document.

### **3.1 Wildlife**

The wildlife resource analysis area used for the Hurricane Analysis Area (AA) includes Compartments 452 – 458, 463 and 464, totaling 12,532 acres (19.6 square miles). These compartments were selected as the analysis area because of natural and man-made boundaries; for example, Cold Springs Creek, Pigeon River, and the Hurricane Creek watershed. This analysis area contains 9,421 acres (14.7 sq mi) of public lands and 3,111 acres of private lands in Haywood County. This watershed is representative of a generally well-balanced age class distribution with representation within all age groups.

There are numerous grape vines and arbors, within young stands the grape vines are so dense that the regeneration is being severely damaged. Other understory or brush soft mast species found throughout the analysis area include; holly, sourwood, witch hazel, greenbrier, spicebush, huckleberry, sassafras and buffalo nut. Along the road corridors and openings, pokeweed, elderberry and sumac are prevalent. Hard mast species are present in all stands. Ephemeral stream corridors are numerous in the analysis area with rock outcrops and boulder complexes. These areas are found to exhibit an overstory of cove species, hemlock understory, dead and dying insect foraging trees, den trees, and grape vines throughout, making them high value wildlife habitat.



### **3.1.1 Species Utilizing Early Successional Habitat (Issue 1) Species Utilizing Grass/Forb Habitat (Issue 2)**

#### **Issue 1: Effects on wildlife species utilizing early successional habitat**

The Hurricane AA is currently below the desired conditions for dispersed early successional habitat outlined in the Forest Plan for Management Area 3B and Compartments 457 and 458. This lack of additional early successional habitat in the timber suitable portions of the project area could result in negative impacts to wildlife species dependent on early successional habitat. An indicator (measure) of early successional habitat has been identified and will be used to differentiate between the different alternatives. This indicator is 0-10 year old stands in the AA.

#### **Issue 2: Effects on wildlife species utilizing grass/forb habitat**

The Hurricane Analysis Area is currently below the desired condition of 3% grass/forb openings in Management Areas 3B, 4A, and 4C. This lack of additional grass/forb habitat in the project area could result in negative impacts to wildlife species dependent on grass/forb habitat. Acres of grass/forb openings present in the AA have been chosen as an indicator of the grass/forb component of the project area. This indicator will be used to evaluate the different alternatives.

Two species, eastern wild turkey and ruffed grouse, were analyzed to represent effects on wildlife species utilizing early successional and grass/forb habitat in the Hurricane AA.

#### **Existing Condition (Ruffed Grouse and Eastern Wild Turkey)**

**Ruffed grouse** require both mature forests with a conifer understory and dense, early successional habitat. Seeps and riparian areas provide much of the herbaceous food during spring; however, the limiting component for this species is early successional and brood (grass/forb) habitat. Grass/forb habitat provides habitat for a diverse insect component, in sufficient quantity, necessary for the high protein required for brood survival. The dense habitat found in early successional habitat provides both protection from prey, and soft mast, buds, and invertebrate food throughout the year for the grouse. Mature stand are used during drumming season by the adult birds and the conifer understory provides both soft and hard mast food and thermal cover during winter months. The current Nantahala/Pisgah National Forests Management Indicator Species (NPNF MIS) report determined that ruffed grouse populations are considered to be low and habitat is limited across the national forest.

**Eastern Wild Turkey** requires large areas moderately free from the disturbance of motorized vehicles and intensive timber harvesting. This area is already subject to large amounts of disturbance due to heavy recreational use. Desired habitat conditions are; open road density less than 0.5 miles per square mile over 5 square miles, 20 acres of grass/forb brood habitat per square mile, early successional habitat more than 5%, but less than 15% per square mile, and a minimum of 150 pounds per acre of hard mast production per square mile.

Across the Nantahala and Pisgah National Forests, wild turkey populations have increased due to factors other than habitat management. As reported in the current NPNF MIS report, record harvests have occurred for the last four consecutive years, both statewide and in the Western Region. In the Western Region, the 2000 reported spring gobbler harvest of 3,137 birds, which represents a 29% increase over the 1999 reported spring gobbler harvest of 2,428 birds. The dramatic population growth of the eastern wild turkey in recent years is due to the restocking programs of the North Carolina Wildlife Resources Commission. This species is just now occupying the available habitat. As populations increase, the lack of active management across the Forest will increasingly constrain population levels.

### **Direct and Indirect Effects to Ruffed Grouse and Eastern Wild Turkey**

**Ruffed Grouse:** Alternatives A and E would have a negative cumulative effect of insufficient grass/forb habitat and the early succession habitat would be reduced as it grows into the 11-20 age class and the 11-20 age class grows into mid-successional habitat. In Alternative B, the grass/forb component would increase by 34.5 acres, while converting 12 acres to a more diverse grass/forb area of warm season grass mix. Prescribed burning of Fines Creek field #1 is expected to maintain both the warm season grass/forb herbaceous cover and the brushy edge surrounding the field. The placement of barriers to restrict use of the linear grass/forb areas to foot traffic only, would benefit the ruffed grouse. Early Successional habitat would increase 168 acres. Alternative C would have much the same affect to Ruffed Grouse habitat as Alternative B; however, early successional habitat would be increased 224 acres and grass/forb 22.5 acres. Alternative D would increase early successional habitat 149 acres and grass/forb 18 acres.

The current NPNF MIS report determined that ruffed grouse populations are considered to be low and habitat is limited across the national forest. Due to reduced timber management activities, ruffed grouse populations will likely decline on the National Forest in the future as suitable habitat declines in quality, abundance and distribution. Alternatives B, C, and D would improve the habitat within this analysis area but will not likely reverse the downward trend across the Pisgah National Forest.

**Eastern Wild Turkey:** Alternative A would not increase the grass/forb habitat component or increase the hard mast component over the long term. The trespass by recreational horse use will continue causing disturbance and potential damage to wildlife fields and linear openings. Alternative E would erect a barrier and place interpretive signs, restricting recreational disturbance of Fines Creek field #1. However, there would be no further benefit to the wild turkey habitat with implementation of Alternative E. Alternative B would result in the greatest benefit to wild turkey, mainly because of the larger development of grass/forb habitat. Alternative C and D would result in slightly reduced benefits to wild turkey habitat as depicted in the following habitat table.

**Table 5: Summary of Effects to Ruffed Grouse and Eastern Wild Turkey by Alternative**

Habitat	Desired	Alt A & E	Alt B	Alt C	Alt D
Grass/forb					
High quality	254 acres	59.2 ac	+ 34.5 ac	+ 22.5 ac	+ 18 ac
Low quality	N/A	65.4 ac	N/A	N/A	N/A
0-10 year age class	710 ac	527 ac no change	+ 133 ac	+ 224 ac	+ 149 ac
Grass/forb per sq mile	17 ac	6.36 ac	8.12 ac	7.51 ac	7.28 ac

**Cumulative Effects to Ruffed Grouse and Eastern Wild Turkey**

Alternatives A and E would have a negative cumulative effect of insufficient grass/forb habitat and the early succession habitat would be reduced as it grows into the 11-20 age class and the 11-20 age class grows into mid-successional habitat.

Alternatives B, C, and D would increase the early successional habitat and grass/forb habitat across the analysis area (AA) as shown above. The grass/forb habitat in all of these alternatives is still lower than the desired density for the project area. Sudden storms or disease and insects infestations could further increase the early successional habitat across the analysis area. The early successional habitat, under these alternatives, is well below the maximum recommend acres for the AA. Timber cutting or field clearing on private land could increase the availability of these habitats in the analysis area; however, it is unlikely that this would happen on enough acreage to cause over representation of these habitats in the analysis area.

**3.1.2 Species Utilizing Late Successional Habitat (Issue 3)****Issue 3: Effects on wildlife species utilizing late successional habitat**

The proposed harvesting activities may affect habitat for black bear and other species that utilize late successional habitat. There are management areas within this analysis area that place an emphasis on species that require late successional habitat. A desired future condition for Management Area (MA) 4C is to provide for visually pleasing scenery and habitats for wildlife requiring older forests. These lands are not suitable for timber production. There are approximately 4,274 acres of the Hurricane AA located in MA 4C. This MA represents about 45% of the analysis area. Stands greater than 80 years old will be used as an indicator of late successional habitat and will be used to differentiate between the different alternatives. This indicator will be used to represent late successional habitat within both the analysis area and Harmon Den Bear Sanctuary.

Black bear was analyzed to represent effects on wildlife species utilizing late successional habitat in the Hurricane AA.

### **Existing Condition (Black Bear)**

**Black Bear** populations have increased across the forest due to factors other than habitat management, probably due to the benefits of the state black bear sanctuary system. As young bears migrate from these protected areas, they increasingly occupy habitats with little or no hunting pressure, allowing the population to increase further. Mountain population models, based on age structure and reproductive information collected by North Carolina Wildlife Resources Commission personnel, indicate that populations have grown considerably over the last decade. Models are most accurate at predicting populations up to 2-3 years prior to the last year for which we have age and reproductive data. Therefore, we can be confident in a population increase experienced from 1980-1996. These models indicate the system of regulations, enforcement, and sanctuaries in place in the region should be effective in protecting females and in maintaining a viable mountain population despite increasing harvests.

### **Direct and Indirect Effects to Black Bear**

**Black bear:** Alternative A would have no effect on the habitat capability of the sanctuary or analysis area (AA) nor would it decrease the disturbance on current linear openings which bear utilize as travel corridors and exhibit large quantities of soft mast shrub layers. Alternative E would erect a barrier on Fines Creek field #1, however it would not place a barrier on the linear openings that would specifically benefit the bear habitat.

All action alternatives (B-E), propose TSI treatments, which would involve manually cutting or clipping grape vines and soft mast tree species that are a minimum of 50% of the height of selected trees. The actual treatment area is approximately 5.5 acres of the 110 acres specified. This action would have no effect on the soft mast production over the 110 acre specified area of early successional habitat. Therefore, there would be no effect to the black bear utilization of this area from TSI treatment.

Thinning and prescribed burning would temporarily reduce the amount of huckleberries available within 15 acres of Compartment 457, stand 17. However, more vigorous growth and production of huckleberries would be seen within 3 years after the burn treatment. The residual trees within this proposed thinning would be hard mast species, where available. This activity would have no effect on the bear habitat present within 457/17 (Alternatives B, C, and D). The planned actions of supplemental red oak seedling planting, advance oak treatment, residual tree marking guidelines and manual silvicultural release are expected to increase the long term oak composition within forest type 56 communities (Alternatives C and D). The planned advance oak treatment and manual silvicultural release is expected to contribute to the long term oak composition within forest type 56 communities in Alternative B; however, the overall effect will likely be in a lower overall oak component without supplemental oak planting.

Alternative B may reduce the habitat capability on 9.5 acres of the sanctuary. This acreage amount was not significant to cause a change to the capability of the sanctuary as a whole. Alternative C would reduce the habitat capability on 25.5 acres of the sanctuary, which reduced the habitat capability rating for the sanctuary by 0.01. The road re-construction and construction proposed would increase the linear grass/forb by 1.5 acres is expected to benefit the black bear (Alternatives B and C). Alternative D would have no effect on the hard mast production or the habitat capability of the sanctuary and AA. The proposed barrier construction and signing on the linear openings would increase the quality of this current habitat component.

**Table 6: Summary of Effects to Black Bear by Alternative**

	<b>Alt A</b>	<b>Alt B</b>	<b>Alt C</b>	<b>Alt D</b>	<b>Alt E</b>
Reduced Disturbance (structures)	0 str	2 str	2 str	2 str	1 str
Reduced Mature Forest	0%	1.1%	1.8%	1.2%	0%
Reduced Habitat Capability	0%	<1%	1%	0%	0%

The overall affect to Black Bear or its habitat would be minimal for all alternatives considered.

### **Cumulative Effects to Black Bear**

There would be no cumulative effects to black bear caused by the alternatives considered outside those defined in the species specific analysis; however, there are cumulative effects to the vegetative component within the analysis area. Inventories of the existing species component within 5-20 year age class stands resulted in finding little to no hard mast species present. The advanced oak treatment, supplemental large red oak seedling plantings, and manual silvicultural release, would increase the likelihood 20% plus hard mast component within forest community type 56 stands in these proposed action alternatives. This missing hard mast component in the 0-20 age class stands will result in an increased pressure on older age class 53 forest communities in the long term.

Research has indicated that white and red oak acorn production decreases as the trees age beyond 90 years. Scarlet oak typically declines due to disease at 70-80 years of age. The majority of forest type 53 and all other forest communities within the sanctuary are currently 61-90 years of age. Over the next twenty years, the sanctuary will reach its carrying capacity due to available hard mast availability. This affect may have a long-term negative effects to dispersing bear populations as they encounter open roads and high recreational use. This affect will result for all

alternatives. The potential will be increased by the implementation of Alternative C due to the 25.5 acres of existing forest type 53 community proposed for regeneration. However, the proposed regeneration is for a stand that is 91 years of age and may be experiencing a reduced acorn production over the next planning period.

## **3.2 Roads**

The 9,421 acre Hurricane Creek Analysis Area (AA) was used as the analysis area for roads. An inventory of all the federal, state, and Forest Service roads located within the AA was conducted.

The main access to the Hurricane Analysis Area (AA) is provided by the Cold Springs Road, Forest Service (FS) 148. The Cold Springs road can be reached from Exit 7, the Harmon Den Exit, off Interstate-40 or from Secondary Road 1182. The Fall Branch Road, FS 3576, provides access to Unit 452/13. The Brady Road, FS 3526, and the Fall Branch Road, FS 3525, provide access to Unit 452/28. The Hurricane Ridge Road, FS 3570, provides access to Units 452/28 and 458/6. The Hurricane Ridge Road extension, FS 3570E, provides access to Units 453/2,4,18, 457/17, 458/8, 458/11, and 458/16. The Bear Branch Road, FS 3572, provides access to Units 458/15, 458/18, 457/7,20, and 457/9,15. Approximately 1500 feet of road reconstruction on FS 3572 and 3200 feet of new road construction would be needed to access Units 457/7,20 and 457/9,15.

### **3.2.1 Roads Management (Issue 4)**

#### **Issue 4: Effects on the management of the road system**

Adding additional miles to the existing road system may influence the ability of the Forest Service to maintain all of the miles of road on the system. Miles of new road added to the Forest Service system will be used to evaluate the alternatives.

#### **Existing Condition (Roads)**

Currently there are about 15.1 miles of open Forest Service roads located within the Hurricane AA. In addition, approximately 8.3 miles of Interstate-40 lie within the boundaries of the AA. There are approximately 28.8 miles of closed Forest Service roads located within the boundaries of the AA. An information chart listing all of the roads within the AA and a map of the roads within the AA are located in Appendix I.

All roads within the analysis area are needed for resource management and/or public access to public and/or private land. There are two Forest Service roads, the Hurricane Road (FS 233) and Cold Springs Road (FS 148), located within the project area with environmental and public safety risks.

The Hurricane Road (FS 233) is narrow and steep with few turnouts. Some repairs and improvements have been made recently to the road such as waterbars; however, the roadbed itself was not repaired. Hurricane Creek is currently included on the North

Carolina Division of Water Quality’s 303d list for impaired water bodies. The primary cause of listing is the amount of sediment currently in and continuing to enter the creek. There are several sources of sediment to Hurricane Creek including road runoff from existing open and closed roads on both National Forest and private property. Illegal use of off road vehicles (ORVs) on closed roads, illegal trails and established wildlife openings contributes to the high sedimentation levels in Hurricane Creek. This road provides access to private land so it cannot be closed.

The Cold Springs Road (FS 148) is a collateral road; however, it is one lane and has many blind curves. In 2002, this road was to be widened to reduce these risks; however, funding was cut for this project due to wildfire expenditures in the western United States.

In addition all roads, particularly open roads, increase risk to invasion by exotic invasive species.

### **Direct and Indirect Effects on Roads**

There would be no new road construction or road reconstruction under Alternatives A, D, and E. There would be approximately 350 feet of temporary road construction under Alternative D. None of these alternatives would add any mileage to the existing Forest Service road system.

There would be approximately 1500 feet of road reconstruction and approximately 3200 feet of new road construction under Alternatives B and C. This road work would provide access to Units 457/7,20 and 457/9,15. There would also be about 1250 feet of temporary road construction under Alternatives B and C. These alternatives would add about 0.6 miles of road to the existing Forest Service road system. These roads would be managed as closed to the public and would not change the open road density within the AA.

**Table 7: Miles of road added to the existing road system by Alternative**

	<b>Alt. A</b>	<b>Alt. B</b>	<b>Alt. C</b>	<b>Alt. D</b>	<b>Alt. E</b>
Miles of road added to the existing road system	0	0.6 miles	0.6 miles	0	0

For Alternatives B, C, and D, the risk of expansion of exotic plant species within the timber sale area would be diminished by a provision in the timber sale contract that requires the purchaser to clean his equipment as he leaves a stand already invested with exotic invasive species. The botanist would map the areas containing exotic invasive species before work begins.

### **Cumulative Effects on Roads**

Under Alternatives A, D, and E there would be no change to the existing Forest Service road system. Therefore, there would be no cumulative effects.

Under Alternatives B and C, the miles of open road within the AA would remain at 23.4 miles. The amount of closed road within the AA would increase 0.6 miles to 29.4 miles. The cumulative effects would be very minor in scope since the proposed actions would increase the total mileage of Forest Service roads in the area by about 1%.

## **3.3 Vegetation**

The vegetative analysis area is approximately 9,421 acres and is located in Compartments 452-458, 463 and 464 in the Hurricane area of Haywood County. In addition, the Harmon Den Bear Sanctuary, delineated as Compartments 451-53, 456-61 and 470-74 with a total area of 14,110 forested acres, was used as an additional analysis area for hard-mast production due to the importance of this component to black bears.

The majority of the project area is hardwood forest consisting primarily of yellow poplar, northern red oak, white oak, red maple and hickory. There are small acreages of white pine mixed with hardwoods, cove hardwoods mixed with white pine and hemlock, upland hardwoods, and chestnut and scarlet oak.

### **3.3.1 Long-Term Oak and Hard Mast Production (Issue 5)**

#### **Issue 5: Effects on the long-term oak and hard mast producing components**

The proposed harvesting activities and advanced oak treatments could change the future species composition by changing the oak component of some of the stands. Wildlife species dependent on hard mast could be negatively affected in the long-term by this proposal if the future oak component is reduced. This analysis will use four indicators to show the differences between the various alternatives. Supplemental oak planting and advanced oak treatment are proposed under some of the alternatives. The acres of northern red oak planted to supplement the natural regeneration and the acres of advanced oak treatment will be used as two indicators of maintaining long-term oak and hard mast production. The total acres contributing to hard mast production in both the Hurricane AA and Harmon Den Bear Sanctuary will be the other two indicators used to evaluate the alternatives.

#### **Existing Condition (Oak Stand Component and Hard Mast Production)**

There are 5,624 acres out of 9,421 acres of the Hurricane AA and 10,709 acres out of 14,614 acres of the Harmon Den Bear Sanctuary in hard mast production. Therefore, about 60% of the analysis area and 73% of the bear sanctuary are currently producing hard mast available for wildlife dependent on this habitat component.



### **Direct and Indirect Effects on Oak Stand Component and Hard Mast Production**

Species composition, age-class distribution, and understory vegetation would continue to change, even with harvesting (Alternatives A and E). Existing early successional plant communities would increase in age. A change in species composition would result as shade tolerant species dominate intolerant ones, assuming the suppression of fire. As the mature trees age, they would become more susceptible to damage, disease, and insect problems, especially the ones that are already showing signs of decline.

In stands where no harvesting is proposed, hard and soft mast provided for wildlife will also continue to decline. Openings in the forest canopy caused by damage from insects and disease, wind, ice and snow would occur; generally these are small openings, and the shade tolerant plant and tree species such as maples, dogwood, and sourwood would tend to dominate shade intolerant species, such as oaks, ash, and hickories. Some yellow poplar especially in the more moist sites will be able to take advantage of these openings and colonize or repopulate some sites. Protection from fire would continue, significantly reducing the potential for larger openings.

Herbicide site preparation and release, if needed, along with supplemental oak planting in cove hardwood stands is expected to result in oak being recruited into the overstory in the future. Alternatives C (183 acres) and D (124 acres) are expected to maintain their oak component in cove hardwood stands. The oak component would be reduced under Alternative B due to the lack of existing advanced oak seedlings within these units and no supplemental planting of oak proposed under this alternative.

The proposed advanced oak treatment would increase the oak component in the understory by allowing more sunlight to reach the forest floor to stimulate growth and development of species such as oaks, black cherry, white ash, and hickory. Advanced oak treatment would increase the understory oak component in Alternative B (66 acres), Alternative C (50 acres), and Alternative D (125 acres). The oak component in these stands would be present in the understory if these stands were harvested the future.

Hard mast production would be reduced between 0.8% (Alternative B) and 1.8% (Alternative C) within the AA and reduced between 0.5% (Alternative B) and 1.2% (Alternative C) within the Harmon Den Bear Sanctuary. These changes are minimal when considering current hard mast production and would not have any measurable effect on any wildlife species. Regenerating these stands (Alternatives C and D) while maintaining the oak component would help provide for hard mast in the future once these stands begin producing hard mast about age 40.

### **Cumulative Effects on Oak Stand Component and Hard Mast Production**

There are no other planned or ongoing activities within the AA that would affect the oak component or hard mast production. There are no cumulative effects expected on the oak component or hard mast production.

### **3.3.2 Sustainable Supply of Timber in Timber Management Areas (Issue 6)**

#### **Issue 6: Effects on the ability to maintain a sustainable supply of timber**

A desired future condition of timber emphasis areas is to produce a sustainable supply of timber by regulating the growth and removal of trees through time. Forest-wide direction calls for a regular and sustained flow of habitats across the Forests through space and time for diversity and viability of plant and animal populations.

The forest is composed of stands that are delineated according to age, forest type, and site conditions. The goal in timber emphasis areas is a balanced age class distribution. The definition of a balanced age class distribution is a fairly even distribution of acres among all of the age classes. Age-class distribution is helpful in describing forest condition. In this analysis, age class distribution will be used as an indicator to reflect how well the different alternatives represent a balanced age class distribution.

#### **Existing Condition (Sustainable Supply of Timber)**

Approximately 58% of the Hurricane AA is located in Management Areas that are managed for timber production. Or stated another way, about 42% of the Hurricane AA is not managed for timber production. The following table shows the age-class distribution for the forested acres in Management Areas suitable for timber production in the Hurricane Analysis area.

**Table 8: Current Age Class Distribution**

Base Year 2002

Timber Suitable Areas

Hurricane Analysis Area

<b>Age Class</b>	<b>Acres</b>	<b>% of Total</b>
0-10 year age class	183	3.4%
11-20 year age class	472	8.6%
21-30 year age class	141	2.6%
31-40 year age class	106	1.9%
41-50 year age class	0	0
51-60 year age class	23	0.4%
61-70 year age class	699	12.8%
71-80 year age class	1718	31.4%
81-90 year age class	1446	26.5%
91-100 year age class	270	4.9%
100+ year age class	412	7.5%
<b>Total acres</b>	<b>5470</b>	<b>100%</b>

As indicated in the table, 3% of the analysis area is 0-10 years old, 9% is between 11 and 20 years old, 5% is between 21 and 60 years of age, 44% is between the ages of 61 and 80, and 31% is between 80 and 100 years of age, and 8% is over 100 years of age. This information is shown on the “Age Class Distribution Map” located in Appendix D. The definition of a balanced age class distribution is a fairly even distribution of acres among all of the age classes.

### Direct and Indirect Effects to Sustainable Supply of Timber

Regeneration is proposed in Alternatives B, C, and D. The following tables show the changes to the age class distribution under the different alternatives. The changes are shown in acres and in percent of the Hurricane AA represented by each age class.

**Table 9: Age Class Distribution by Alternative After Proposed Treatments**  
shown as acres in Timber Suitable Areas in the Hurricane Analysis Area

Age Class (acres)	Alt A	Alt B	Alt C	Alt D	Alt E
0-10 year age class	183	316	407	332	183
11-20 year age class	472	472	472	472	472
21-30 year age class	141	141	141	141	141
31-40 year age class	106	106	106	106	106
41-50 year age class	0	0	0	0	0
51-60 year age class	23	23	23	23	23
61-70 year age class	699	664	664	664	699
71-80 year age class	1718	1651	1576	1620	1718
81-90 year age class	1446	1415	1415	1430	1446
91-100 year age class	270	270	254	270	270
100+ year age class	412	412	412	412	412
<b>Total acres</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>	<b>5470</b>

**Table 10: Age Class Distribution by Alternative After Proposed Treatments**  
shown as a percentage of the Timber Suitable Areas in the Hurricane Analysis Area

Age Class (percent of timber suitable ac)	Alt A	Alt B	Alt C	Alt D	Alt E
0-10 year age class	3.4%	5.8%	7.5%	6.2%	3.4%
11-20 year age class	8.6%	8.6%	8.6%	8.6%	8.6%
21-30 year age class	2.6%	2.6%	2.6%	2.6%	2.6%
31-40 year age class	1.9%	1.9%	1.9%	1.9%	1.9%
41-50 year age class	0	0	0	0	0
51-60 year age class	0.4%	0.4%	0.4%	0.4%	0.4%
61-70 year age class	12.8%	12.1%	12.1%	12.1%	12.8%
71-80 year age class	31.4%	30.2%	28.9%	29.7%	31.4%
81-90 year age class	26.5%	26.0%	26.0%	26.1%	26.5%
91-100 year age class	4.9%	4.9%	4.5%	4.9%	4.9%
100+ year age class	7.5%	7.5%	7.5%	7.5%	7.5%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

There would be no changes in the age class distribution in Alternatives A and E. Under Alternatives B, C, and D, the 0-10 year age class would increase from 3% to 6 or 7%. There would be no changes in the 11-60 year old age classes. There would be a decrease of less than 1% in the 61-70 year age class. There would be decreases of 1.2% (Alternative B), 2.5% (Alternative C), and 1.7% (Alternative D) in the 71-80 year age class. The 81-90 year age class would decrease 0.5% in Alternatives B and C and would decrease 0.4% in Alternative D. There would be a decrease of 0.4% in the 91-100 year age class in Alternative C. There would be no changes to 100+ year age class in any of the alternatives.

In general Alternatives B, C, and D would help meet the objective of a healthy sustainable forest and provide a more balanced age class distribution.

### **Cumulative Effects to Sustainable Supply of Timber**

There would be no known cumulative effects to the age class distribution of the Hurricane AA because there are no other proposed, planned, or on going activities that would change the age class distribution. Natural events including windstorms and insect or disease infestation could change the age class distribution; however, the effects of such events are unpredictable and would occur across all alternatives.

### **3.3.3 Short-Term Supply of Timber (Issue 7)**

#### **Issue 7: Effects on the ability to produce a short-term supply of timber**

Portions of the Hurricane Analysis Area are located in management areas with an emphasis on timber production. Approximately 58% of the Hurricane AA is located in Management Areas that are managed for timber production. These areas are managed to produce timber over both the short- and long-term. All of the areas proposed for timber harvesting are located within Management Area 3B which places an emphasis on producing a sustainable supply of timber.

#### **Existing Condition (Short-term Supply of Timber)**

There is not any timber currently being harvested or planned for harvesting on National Forests lands within the Hurricane AA. There is no knowledge of ongoing or planned timber harvesting on private lands located within the Hurricane AA.

#### **Direct and Indirect Effects to Short-term Supply of Timber**

There would be no timber harvested in Alternatives A and E. These alternatives would not contribute toward meeting the need of providing a sustainable flow of timber from the national forests, because no timber would be removed.

Alternatives B, C, and D would help meet the objectives of providing a sustainable flow of timber. The following chart depicts estimated volume produced by each alternative.

**Table 11: Estimated Timber Volume** in hundred cubic feet (CCF) and million board feet (MBF) for each alternative.

	<b>Alt. A</b>	<b>Alt. B</b>	<b>Alt. C</b>	<b>Alt. D</b>	<b>Alt. E</b>
<b>Volume of timber produced (CCF)</b>	0	4127 CCF	5147 CCF	3337 CCF	0
<b>Volume of timber produced (MBF)</b>	0	2270 MBF	2831 MBF	1835 MBF	0

Alternatives B, C, and D are supported by the science of forest management by integrating research and management to achieve the projects objectives as outlined in the Forest Plan. These alternatives also emphasizes high value hardwood sawtimber as a condition and commodity, high quality hardwood species on highly productive sites and takes advantage of the forests ability to produce large trees of hardwood species such as northern red oak and black cherry.

#### **Cumulative Effects to Short-term Supply of Timber**

There would be no effects in addition to those disclosed under direct and indirect effects because there are no other timber harvests currently proposed, planned, or ongoing within the analysis area.

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